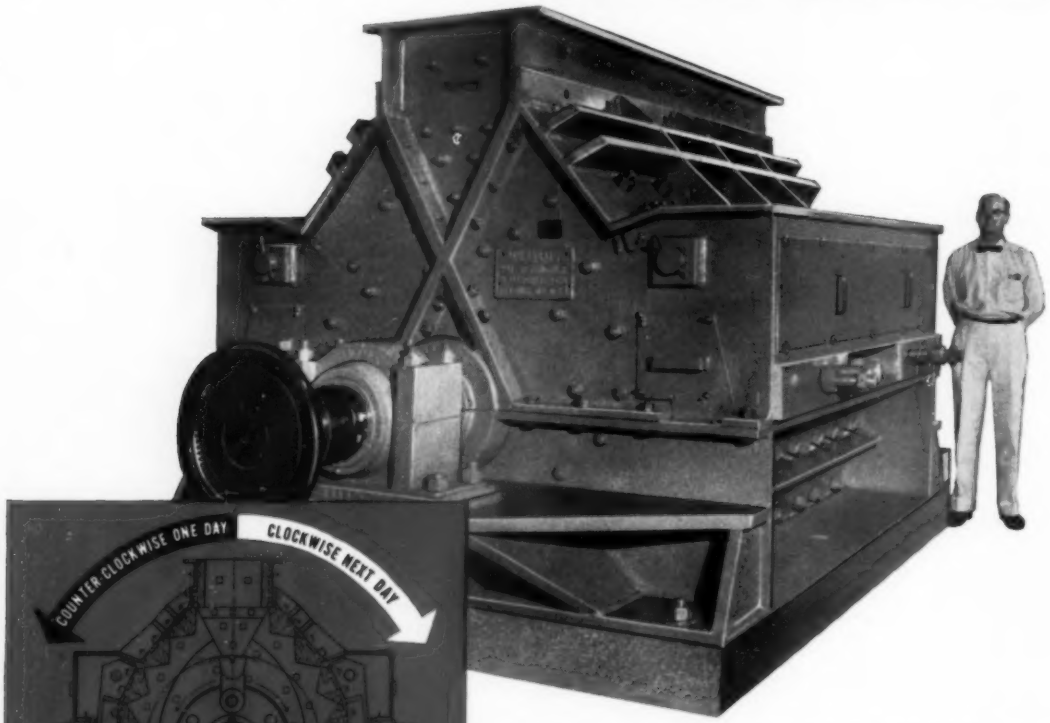
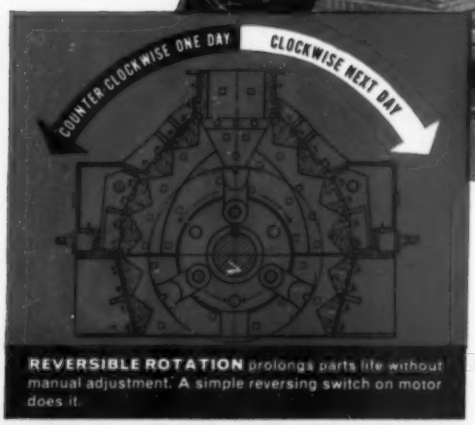
MAY 1960

# ROCK PRODUCTS

**Annual Cement Issue** See Contents page 2

# More efficient CRUSHING AT LOWEST COST for labor, power and upkeep with WILLIAMS REVERSIBLE IMPACTOR






**REVERSIBLE ROTATION** prolongs parts life without manual adjustment. A simple reversing switch on motor does it.

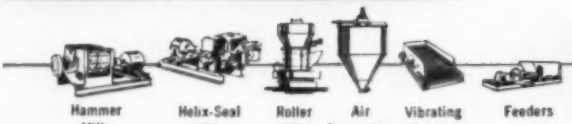
**INTERIOR VIEW** of small Impactor shows typical rugged hammers, impact blocks and liners made of manganese steel and other alloys. Rotor removable without disturbing feed or other mechanisms.

For secondary crushing, the economy and high production of a Williams Reversible Impactor is unequalled, whether raw material is hard and abrasive or soft and friable. Precision control of specified top-size is easy, usually in a closed circuit system, from a coarse 2" with minimum fines, down to 35 mesh or finer.

The Impactor has no grates. Material fed into the mill is reduced to proper size while rebounding between the whirling hammers and impact blocks, until discharged from bottom opening. Grinding or rubbing action is eliminated—power, replacement parts and downtime are reduced to a minimum. No fine adjustments need be maintained.

*Reversible rotation* is a prime feature of the Williams. So is *Wide Open Accessibility* to interior. So are the *Interchangeable Impact Blocks* to balance wear. So are the many other exclusives that hold cost-per-ton to the very lowest. There is a size and model for your exact needs. *Write for catalog.*

**WILLIAMS PATENT CRUSHER AND PULVERIZER CO.**
800 St. Louis Ave. • St. Louis 6, Mo.



Hammer Mills · Helix-Seal Mills · Roller Mills · Air Separators · Vibrating Screens · Feeders

**WILLIAMS**
CRUSHERS · GRINDERS · SHREDDERS
*Oldest and largest manufacturers of hammer mills in the world*

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## NEW Link-Belt bucket elevator chain developed

# for high elevators handling abrasive materials

**Elevators in cement mills and similar installations handling abrasive materials benefit from the long service life of these durable SS Class bushed chains**

**SS-2857: 6″ pitch; 130,000# chain**
**SS-2859: 6″ pitch; 200,000# chain**
**SS-2864: 7″ pitch; 200,000# chain**

The punishing effects of heavy loads and severe abrasives are easily absorbed by the three new Link-Belt elevator chains listed at the left. The chains are capable of uninterrupted service day-in and day-out—even on high, heavily loaded elevators—because of their balanced design and high strength.

Hardened steel sidebars are machined for accurate, uniform pitch. Alloy steel pins are specially heat-treated to combine toughness and wear resistance without sacrifice of shear strength. Alloy steel bushings are case-hardened to resist wear and sprocket impact.

For full details on these rugged elevator chains, or other Link-Belt SS Class chains for lighter service, call your nearest Link-Belt office or authorized stock-carrying distributor, listed under CHAINS in the yellow pages of your phone book. Or write for new, comprehensive Catalog 1050.

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LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 15.342

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# ROCK PRODUCTS

a Maclean-Hunter publication, Vol. 63, No. 5



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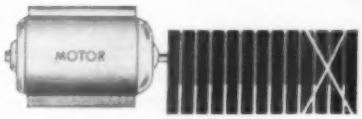
# B.F.Goodrich V belt briefs

TIPS ON THE CARE, MAINTENANCE AND SELECTION OF V BELTS FOR INDUSTRY

## BFG V belts have 40% greater horsepower rating, cost no more

All B.F.Goodrich V belts now have 40% greater horsepower rating. This higher capacity rating was formerly found only in high capacity belts, but now costs *no more than former standard belts.* This means that lighter, more compact, and lower cost drives can now be used, because these B.F.Goodrich belts carry the horsepower needed for efficient drives using fewer belts at standard belt prices.




*9 V belts can now do work of 13.*

## What caused these failures?

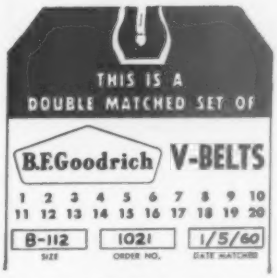
*Answer:* Prematurely worn sides are caused by grit, dirt or any such abrasive contact. Misalignment often causes wear on one side only. To prevent, align the sheaves, checking with straightedge or cord. Keep belts and sheave grooves clean.

*Answer:* Belt put on improperly, or foreign objects fell into groove to rupture cover fabric. To prevent, move motor toward driven sheave when replacing belt. If rupture was caused by foreign object, protect belts with a cover.

## BFG double matching program keeps V belts matched during the life of the drive

Double-matching assures you that a set of B.F.Goodrich V belts are of equal length when installed and will stay uniform in length for the life of the belts. When V belts of different lengths are put on the same drive, longer belts loaf, while shorter ones carry all the load and fail quickly. B.F.Goodrich double-matched belts are measured *twice* for uniform length, once when manufactured and again after storage. Only belts that are of equal length when manufactured and after storage are grouped into sets.

Belts that are grouped into sets are tied together with a tag which gives the date when belts were matched. Belts which have been in storage over a year and "tag ends" are returned to BFG for replacement to make sure that your distributor always has a fresh stock of double-matched belts.




*Here's the tag which goes on each set of double-matched belts, giving exact date belts were matched.*

## How to protect against static electricity in V belt drive

Static electricity is developed on every V belt drive. If there is an explosive atmosphere under certain conditions it can trigger an explosion.

Various means are used to get rid of this static charge. The most reliable method is in the use of static conducting V belts which are grounded to both the motor and the driven unit.

*But unless the motor and the driven unit are properly grounded there can be no protection regardless of the type of static conducting V belt used.*

Static conductivity in a V belt is made possible by special compounds used in the cover. Because cover wear reduces the belts' ability to conduct static, drives should be inspected frequently. Any belts showing cover wear should be replaced immediately. With any set of V belts, it is good practice to replace the entire set.

When ordering BFG Multi V belts, "static conducting" belts must be specified and cost slightly more. All BFG Maxipower V belts are static conducting and heat and oil-resistant at no extra cost.

## The Question Corner—

Grommet construction is exclusive in B.F.Goodrich V belts. Grommets are two extra strong cord loops, inside the belts, like twisted cables, except they are endless. Unlike ordinary belts, there are no center cords in the Grommet belt, so it is more flexible, can "give" temporarily and absorb shock loads.

Let your B.F.Goodrich distributor show you how this higher capacity, longer belt life, ability to stand hard use, can reduce your V belt costs per year and make other savings in operating and maintenance costs.

## Ask a factory-trained specialist

For help in selecting V belts for any kind of service, call the man who is a specialist in V belts—your B.F.Goodrich distributor. He can help you cut costs by getting longer life from your V belt drives. *B.F.Goodrich Industrial Products Company, Dept. M-800, Akron 18, Ohio.*

**B.F.Goodrich V belts**

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# entirely NEW ...ANOTHER TELSMITH SCREEN

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**And now, the NEW TELSMITH HORIZONTAL SCREEN with**

- **new space-saving compactness**
- **new thorough dewatering**
- **new sizing efficiency**
- **new high capacity**
- **new savings in operation and up-keep**
- **single, double, and triple deck; all sizes**

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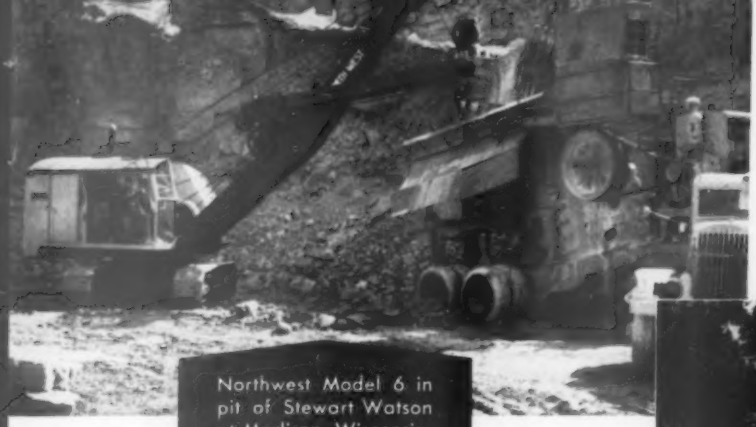
# MORE NORTHWESTS for WISCONSIN Aggregate Producers!



Northwest Model 6 in pit of Stewart Watson at Madison, Wisconsin.

Daanen & Janssen handle some heavy digging in their quarry at DePere, Wisconsin.

WISCONSIN Aggregate Producers have found the answer to their pit problems. Three more Northwests have gone into well operated pits in Wisconsin. Stewart Watson is using a new Model 6 Shovel in his quarry at Madison. Daanen & Janssen is feeding a primary with a new Model 41 at De Pere and Yahara Materials, Inc. is feeding bank run to a Cedar Rapids plant at Waunakee with a new Model 6 Dragline.

These Northwests are fast and they're always ready to go. We hear it everywhere and Northwest operators and owners will tell you so. They maneuver easily in the pit and around stock piles or bins.

The Feather-Touch Clutch Control, with its true "feel" of the load combines with the smooth performance of Uniform Pressure Swing Clutches to make spotting the dipper or bucket easier, reducing spillage.

Machinery Bases and Machinery Side Frames are heat-treated, alloy steel castings that take the strains of rock digging and eliminate constant rebuilding. The Northwest Dual Independent Crowd utilizes force most independent crowd shovels waste and makes greater output in quarry work possible. If you are planning new equipment for your pit, look into the reason for the many repeat orders for Northwest equipment placed by quarry operators. Northwest advantages make money. A Northwest man will tell you all about them.

A Northwest will give you high output in digging like this. Yahara Materials, Inc. at Waunakee, Wisconsin.

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G-16-S

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**NORTHWEST EQUIPMENT IS BUILT IN THE FOLLOWING SIZES**

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| ¾ Yd. to 2½ Yd. Capacity | 13-Ton to 60-Ton Capacity | ¾ Yd. to 3 Yd. Capacity | ¾ Yd. to 2½ Yd. Capacity | 25-Ton to 35-Ton Capacity |

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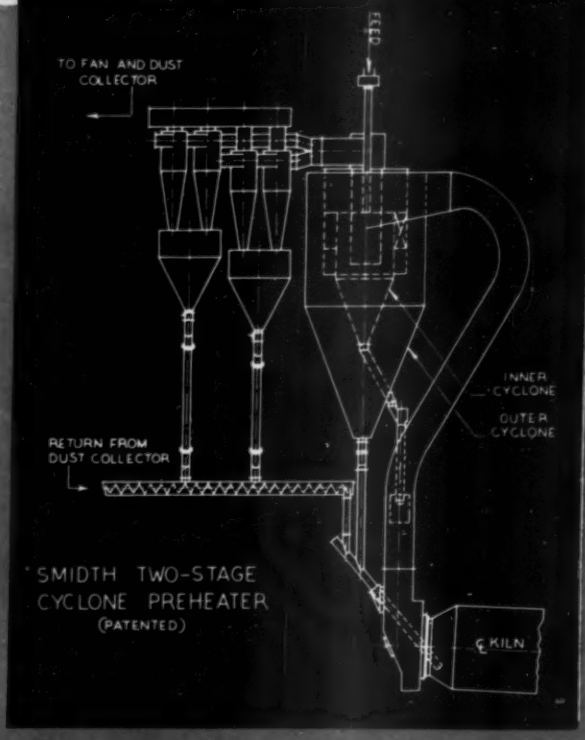


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# WHAT'S HAPPENING

## IN OTHER FIELDS OF INTEREST TO THE ROCK PRODUCTS INDUSTRY

May, 1960

**Water, water everywhere and all of it drinkable** could be the cry of the thirsty in the not-distant future. Salt water can be freshened by freezing, and Chemical Engineering reports the method is headed for commercialization. Already scheduled are two conversion plants with combined output of 500,000 gal. per day. They will be built by Fairbanks, Morse and Co. in the Negev Desert of Israel, using the process invented by Alexander Zarchin. Cost of producing fresh water from salt water is reported to be only 40 cents per 1,000 gal. The U. S. Southwest, says F-M, may have a plant producing 1 billion gal. per day by 1965.

**If you could trade in your home, wouldn't you move more often?** A group of New York builders and realtors think you would. They have been urging passage of a measure to establish a trade-in housing program for the state, because they think it would boost the sales of both new and used homes and stimulate the business climate. Under the plan, a trade-in housing insurance fund corporation would be capitalized and the state divided into appraisal districts. A would-be trader would pay a $25 appraisal fee. If the sale did not bring its appraised trade-in value, the seller would be reimbursed by the corporation up to 80 percent. On the other hand, if he realized a gain on the sale, he would pay 10 percent of the gain to the corporation.

**Prestressed concrete railroad ties may hold the answer** to the railroads' bugaboo: replacement of wooden ties. Currently being tested on a ¼-mile section of track of Seaboard Air Line Railroad near Tampa, Fla., prestressed ties will have the chance their promoters have been seeking—to prove their competitive advantages. The tie being tested was designed by Association of American Railroads and produced by American Concrete Crosstie Corp. Because of their strength, about ⅓ fewer ties are needed per mile of track, and they are expected to outlast wooden ties by two or three times. These advantages, their promoters feel, more than offset their greater cost and weight, both at least twice that of wooden ties.

**New uses for coal are progressing from development to the application stage** with the formation of a new company, Peabody-Wright Corp. At a plant soon to be built, the company will work out applications for the carbonization process developed by Peabody Coal Co. for the production of chemical coke and low-temperature volatile gases from bituminous coal. This process will be combined with the processes developed by Curtiss-Wright Corp. for the recovery of low-temperature coal tar from the volatile gases and production of coal-based paving binder for roads and airport runways.

**The Better Highways Information Foundation** is in the formative stage in Washington, D.C. Persons representing 70 associations and organizations were invited to serve as its founding members. The aim of the foundation is development of a "comprehensive, coordinated, consistent and continuing" highway information program at national, regional and local levels. According to Harry Haller, acting executive secretary, membership eventually will include other groups, such as government, communications media, education, patriotic, fraternal, service, safety and civic organizations.

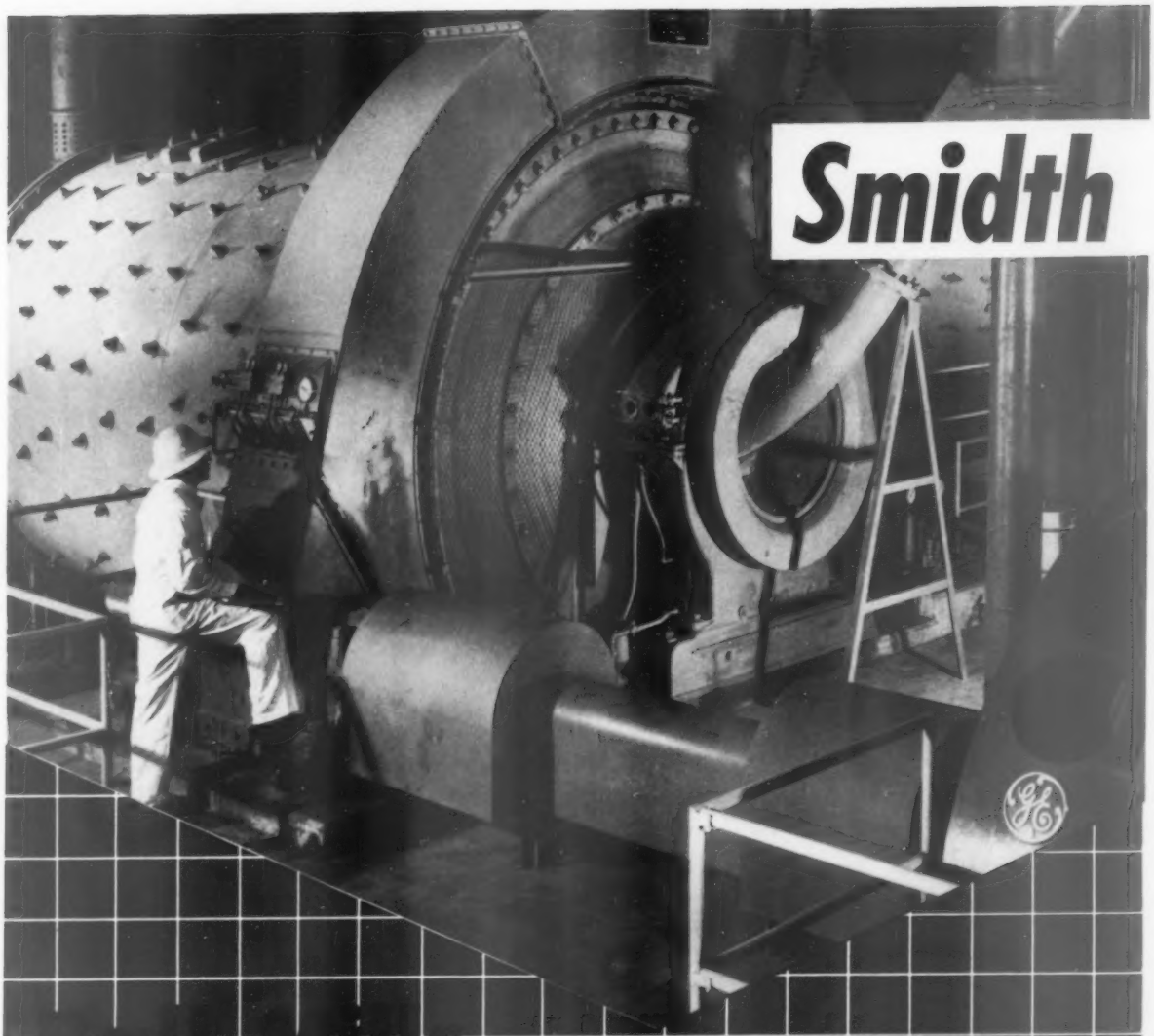
**Rocket jets of flame have been harnessed into a small, manual torch** by an American manufacturer of stone-cutting tools. Linde Co. used the rocket jet principle in developing a new powder lance model. It will be useful for sculptors and stone workers, but also is intended for use in making decorative spalled surfaces, in cutting sections of dimension stone and in producing shallow blast holes for mining and construction jobs.

**Concrete with metal-like qualities has been reported by the Russians.** Tass, the Soviet news agency, said that the concrete is given elasticity and strength by a process involving its extrusion on a rolling mill, followed by its subjection to extreme pressure. "Welding" of two layers is achieved by softening them chemically, then joining them under high pressure. Construction of the first rolling and compressing mill has been started, said Tass.

**Two fireproof asbestos products for jet aircraft** came through tests with flying colors: a cloth to seal openings in firewalls that isolate engine fires from accessory fluid systems, and a resilient packing seal to control intense heat and flame in ultra-high-speed aircraft. They withstood a 2,000-deg. F. flame for an hour without permitting its passage, far exceeding the 15-min. test period. Johns-Manville thinks the flexible seal will have other industrial applications where a comparatively soft packing must resist gases at high temperatures and velocities.

**If blowing sand is troublesome, glue it in place.** The idea sounded practical to California's Division of Highways and the Southern Pacific Railroad, bothered by wind-whipped sandstorms in the desert near Palm Springs. Together they began an experiment in mid-February. It involved spraying an area with a mixture of Turbozan-14, enzymes, grass seed and water. The concoction, developed by Pacific Associates Corp. of Palm Springs, was expected to provide a glassy surface under which grass could take hold.

**Two new drilling techniques have been introduced overseas.** One, a Swedish development, uses circulating oil instead of air to transmit power. This is said to reduce noise to ⅕ that caused by conventional air-powered machines. The second, a Russian invention, is a rig that drills into super-hard rock at the rate of 24.7 fph. A nozzle issues a jet of hot gases at supersonic speeds of more than 393,700 fpm.



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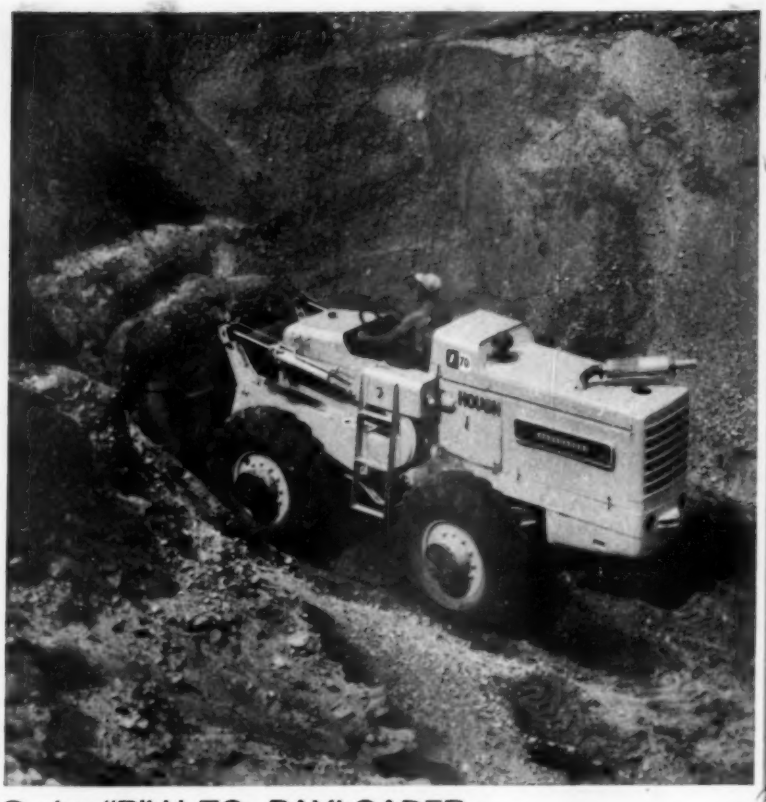
# Series B
# Model H-70
# Model H-90
# NOT NEW
## but . . .



Series "B" H-70 PAYLOADER

## with numerous improvements that give INCREASED PRODUCTION and BETTER PERFORMANCE

"PAYLOADER" leadership over the years is based on superior design, construction and performance of each Model. And "PAYLOADER" leadership is maintained through a policy of progressive engineering. Engineering and research staffs are continually developing and testing new materials, methods, and designs, all directed to improve "PAYLOADER" performance in terms of serviceability and increased output.

As soon as new developments are thoroughly perfected and proved in fleets of test units, they are incorporated into production models. That is why we say the Series B Models H-90 and H-70 are not new machines, but have incorporated into them many new features and design improvements that make them even better performers than before. Your nearby HOUGH distributor is eager to prove it.

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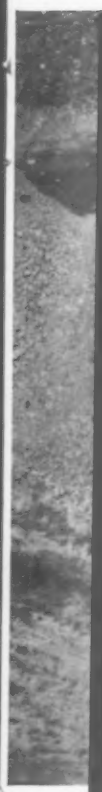

## PAYLOADER®
### *Model H-90 Series B*

CAPACITY: Operating . . . . 9,000 lbs.
Peak Lift . . . . 18,000 lbs.

NEW ENGINE: New, powerful Cummins Turbo-charged diesel engine develops 162 hp at 2,100 rpm. GMC Diesel is optional—develops 153 hp at 2,200 rpm.

MORE STABILITY: Wheelbase is extended and wheel tread is widened which, along with greater machine weight, greatly increases the balance and stability of the machine for ANY working condition.

MORE TRACTION AND FLOTATION: Standard tire size is increased to 18:00 x 25, insuring more traction and flotation whenever they are needed.

MORE STRENGTH: Front axle, main frame and other structural parts have been strengthened to meet the greater work potential of which this machine is capable.

TRANSMISSION AND TORQUE CONVERTER: Major improvements have been accomplished in the full power-shift transmission and the torque converter, resulting in superior throttle response and operating characteristics.

AIR BRAKES: New air brakes are standard equipment and give more positive action with less operator effort than ever before.

## PAYLOADER®
### *Model H-70 Series B*

CAPACITY: Operating . . . . 7,000 lbs.
Peak Lift . . . . 13,000 lbs.

MORE POWER: Available with a larger diesel engine (Cummins 124 hp). Also available with IHC gasoline engine of 110 hp, and GMC diesel engine of 105 hp.

MORE LIFTING POWER: Improvements in the boom arm design and bucket control linkage provide more digging power especially for digging below grade.

HYDRAULIC RESERVOIR: The capacity has been increased to gain greater efficiency for the operation of the many hydraulically-actuated allied accessories that are available, such as: 4-in-1 bucket; side boom; back-hoe.

Series "B" H-90 PAYLOADER

**NEW LITERATURE** is available without obligation on the Series B Models H-70 and H-90, also, an illustrated folder showing all 10 "PAYLOADER" models and the many useful attachments for each.

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**Please send the following:**

- ☐ **Data on Series B model H-70**
- ☐ **Data on Series B model H-90**
- ☐ **Complete "PAYLOADER" line and all attachments**

Name _____
Title _____
Company _____
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City _____ State _____

4-B-1

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# EDITORIAL

by GEORGE C. LINDSAY

## The big challenge for cement

NO INDUSTRY FACES AS GREAT A CHALLENGE as that which lies ahead for the cement industry during the 1960's. The projected growth rate is a challenge in itself. But more important to economic operation may be the solution of brand new problems that could rise from a closer marriage of industry expansion and progress in technology.

Look at growth possibilities first. Never before has cement faced such good prospects for more application and use of concrete products—growth of cement use. The "exploding" population this decade will create the need for new homes, commercial and industrial buildings, churches, schools and shopping centers. The great highway building program will be a continued big user of cement. More than that, creation of an improved highway network will, in itself, open the door to construction of complete new communities adjacent to them, farther removed from urban areas.

The prospects will materialize with our expected economic growth. Experts think the proportion of gross national product represented by new construction will jump from 11 percent now to 14 percent by 1970. The dollar volume of new construction may total $700-750 billion the next 10 years. But that's only part of the market growth possibilities for cement.

The ratio of concrete use to use of other materials in new construction may double by 1970! Simple multiplication of the factors of economic growth and greater acceptance of concrete results in a rosy market picture, indeed.

One look at the picture, as huge and bright as it is, suggests industry growing pains. But look at the rate of progress in technology that has taken place since 1950, and normal growing pains become more acute if that rate be projected to 1970.

How fast was the rate? Some say more technological improvement in the cement industry occurred during the 1950's than all previous improvement in its history. What a stepping stone to use for accelerated progress for cement this decade!

Crystal-balling the areas of cement manufacturing problems, under the circumstances projected, is a difficult task. But, consensus is that complete automation is a goal for 1970. A new look will be given to engineering, maintenance and educational programs, to name a few operating phases that will change with progress in technology.

Machines, money and men will become more closely dependent upon each other, and the importance of the part played by each will be magnified. Control of these factors, individually and collectively, will be a requisite to successful manufacturing operations.

This is the challenge, and it will be met.



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MACWHYTE WIRE ROPE

MADE IN U.S.A.

# THERE'S A REASON WHY IN WHYTE STRAND SHOVEL ROPES!

For your quarrying operation, there are many reasons why Whyte Strand is the best wire rope you can use on your shovels. Here are just a few:

- Every foot of wire in Whyte Strand is specially drawn by Macwhyte in their own wire mill.
- Product engineers determine the exact makeup of each rope to assure correct size, strength, and flexibility to meet your requirements.
- Special Macwhyte lubricants are used in accordance with the needs of the equipment or the type of service in which the rope will be used.
- Entire wire and rope mill operations are concentrated on the making of one product . . . *wire rope!*

But the proof of the pudding is in the using — and here's where Whyte Strand shines. You can spend all kinds of money, but you can't buy a better rope for your shovels than Whyte Strand . . . nor one that will give better service, with less trouble.

Whyte Strand shovel ropes are made in two strengths — Monarch Whyte Strand Improved Plow Steel and PREmium Whyte Strand Extra Improved Plow Steel — both are listed in bulletin No. 6025.

Ask for this new bulletin which gives complete listings of all Whyte Strand wire rope. 213-C

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*How AMSCO screen parts and Simplex* 2-Part Dipper Teeth are giving users greatly improved service life*

AT A LARGE NEW ENGLAND QUARRY

## AMSCO CHUTE PLATES LAST 5 YEARS VS. 4 WEEKS FOR PREVIOUS TYPE

In the screen house of this quarry, two Amsco HC-250 abrasion-resistant chute plates are used on each Hi-G discharge screen. 500 tons per hour pass over each plate, during the two-shift, 20-hour operating day.

This installation resulted from a previous test, in which a set of Amsco plates was compared with regular carbon steel plates. The Amsco Chute Plates *lasted about 5 years*, whereas the competitive plates had to be replaced every 4 weeks.

The quarry operator reports that the Amsco plates presently installed are holding up excellently in service. Their exceptionally long life and trouble-free service means big dollar savings—through elimination of costly shutdown time.

ON THE NIAGARA POWER PROJECT

## AMSCO SIMPLEX 2-PART TEETH DIG 40,000 YARDS OF ROCK BEFORE REPLACEMENT

At the right, you see the type of rugged rock excavation in which this outstanding service record was set. It's part of the Niagara Power Project—Conduit #2 South—being handled by Gull & Defelice Construction Company.

All dippers on the job are equipped with Amsco Simplex 2-Part Reversible Teeth. They operate 16 hours a day, 6 days a week—*handle approximately 40,000 yards of rock*—before tooth replacement is required.

In addition to their exceptionally long wear, the fact that Simplex Teeth *can be replaced in ten minutes with no trouble* is an important advantage to the operators. It all adds up to big savings—in replacement cost and shovel downtime.

*Patent No. 2,904,908

**Wherever high impact and abrasion are problems, you'll "move more tons per dollar" with Amsco Dippers, Dipper Teeth and Crusher Parts. See your equipment dealer, or write us direct for technical bulletins.**

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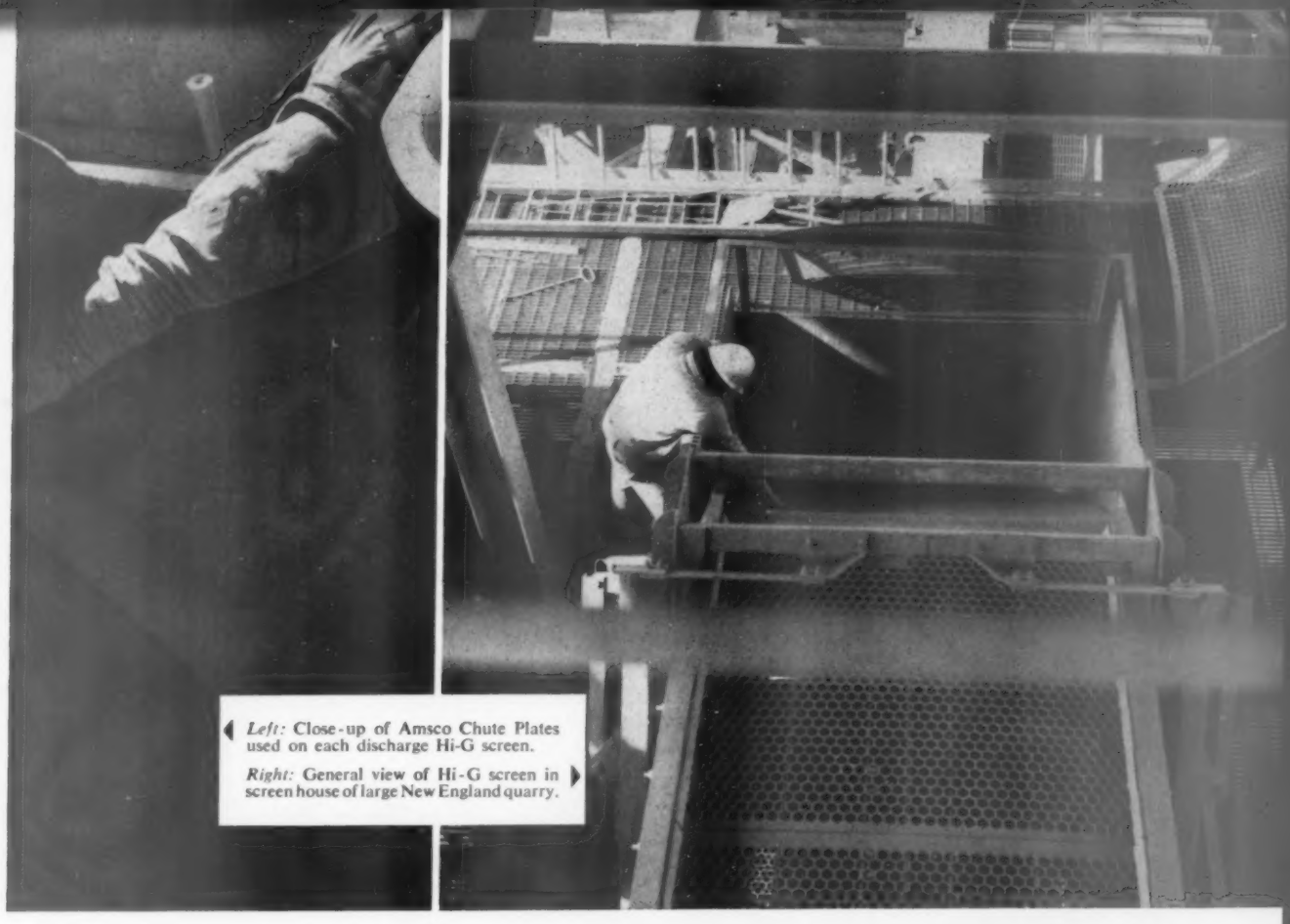
AMERICAN Brake Shoe COMPANY



*Left:* Close-up of Amsco Chute Plates used on each discharge Hi-G screen.

*Right:* General view of Hi-G screen in screen house of large New England quarry.

*Left:* General view of excavation at Conduit #2 South. Dipper on Bucyrus Erie 88B shovel is equipped with Amsco 2-Part Reversible Teeth.

*Right:* Close-up of Amsco 2-Part Reversible Teeth, showing special pin lock which assures positive locking of the reversible tip.

# ROCKY'S NOTES

by NATHAN C. ROCKWOOD

## Petrologist discusses concrete

IN OUR NOTES for the March issue, reviewing and commenting on the new text of Dana's "Manual of Mineralogy," we expressed hope of seeing a discussion of cement and concrete by a mineralogist as competent as the Harvard professor who revised the textbook under discussion. We have our wish granted much sooner than could be anticipated, for since our March Notes were written we have received a copy of the September (1959) issue of the Journal of the Research and Development Laboratories, of the Portland Cement Association, containing an article on "Petrography of Cement and Concrete" by Dr. L. S. Brown, senior research petrographer, Field Research Section, Portland Cement Association.

**In his introduction,** Dr. Brown starts with the very point we were trying to emphasize: "The artificial world of portland cement and concrete has many features in common with materials and processes of the natural world. It is to be anticipated, therefore, that application of petrographic techniques may appreciably and profitably extend our practical knowledge of portland cement, its use and its ultimate products. The objective is that the application shall tell us something about properties that suit a building stone to structural use."

Dr. Brown goes on to say: "In a practical sense, these are three, namely: strength, dimensional constancy and durability. With natural building stones, these properties are more or less taken for granted and little attention has been given to derivation [of these properties]. Concrete, to be useful, must possess the same properties. With concrete, these desired properties derive from the processes by which concrete comes into existence as a structural material. Some knowledge of the processes of derivation therefore is of vital significance." This, in more scientific terms, is exactly the idea we had in mind when we wrote our March Notes.

Dr. Brown then describes the petrographic microscope and how it is used. The examination and identification of minerals is only a part of the science of petrology. The other part is the philosophy "which attempts to determine the origin, history and orderly classification of natural rocks." He then discusses the application of modern petrological methods to an investigation of portland cement clinker. By it, supplemented by chemical analyses, the industry is fairly well informed on the actual composition of unhydrated cement particles.

It is brought out in his discussion that, in the case of portland cement clinker, some new techniques have had to be worked out. Commenting on this, Dr. Brown says: "Little attention has been given to the interpretive side, the question of how the components got where they are. From our knowledge of the manufacturing process it seems evident that a philosophy different from that of natural rocks also is in order. To date, however, few criteria have emerged from which a philosophy might be developed."

That there are difficulties in developing the philosophy, Dr. Brown makes clear. For example, you cannot compare it very well with melts of the igneous rocks for, as he explains, such deductions "are obscured by two considerations. For one thing, we know that some 80 percent of the clinker, the great bulk of the $C_3S$ and $C_2S$ [calcium tri- and di-silicate], remains solid throughout the entire heating process. No portland cement clinker starts with the 100 percent melt of phase studies." In this connection he explodes a common idea that MgO in quickly cooled clinker is dissolved and preserved as a melt in glass, for he says it always shows up as periclase [hard-burned magnesia] and that these units indicate they "are relicts from the raw material and never were in solution."

*Please turn to page 198*

Traylor

# MACHINERY FOR THE CEMENT INDUSTRY

## Traylor kilns

*feature*

Operating Economy
Advance Design
Rugged Dependability

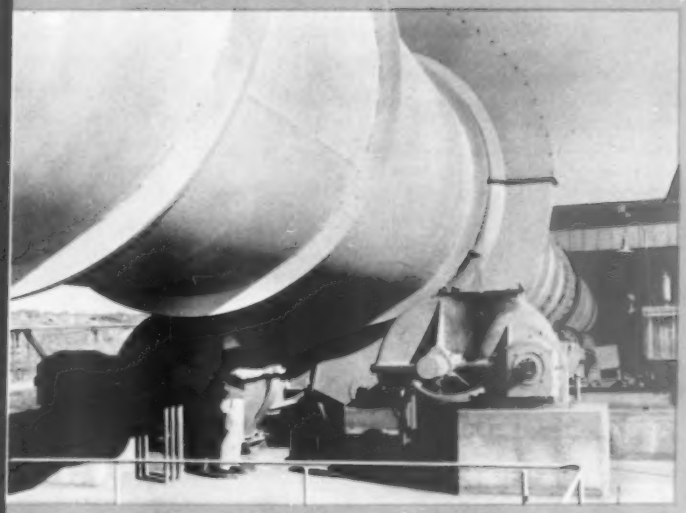


**Photo above shows dual drive on a 15' x 450' Traylor Rotary Kiln in a West Virginia cement plant.**

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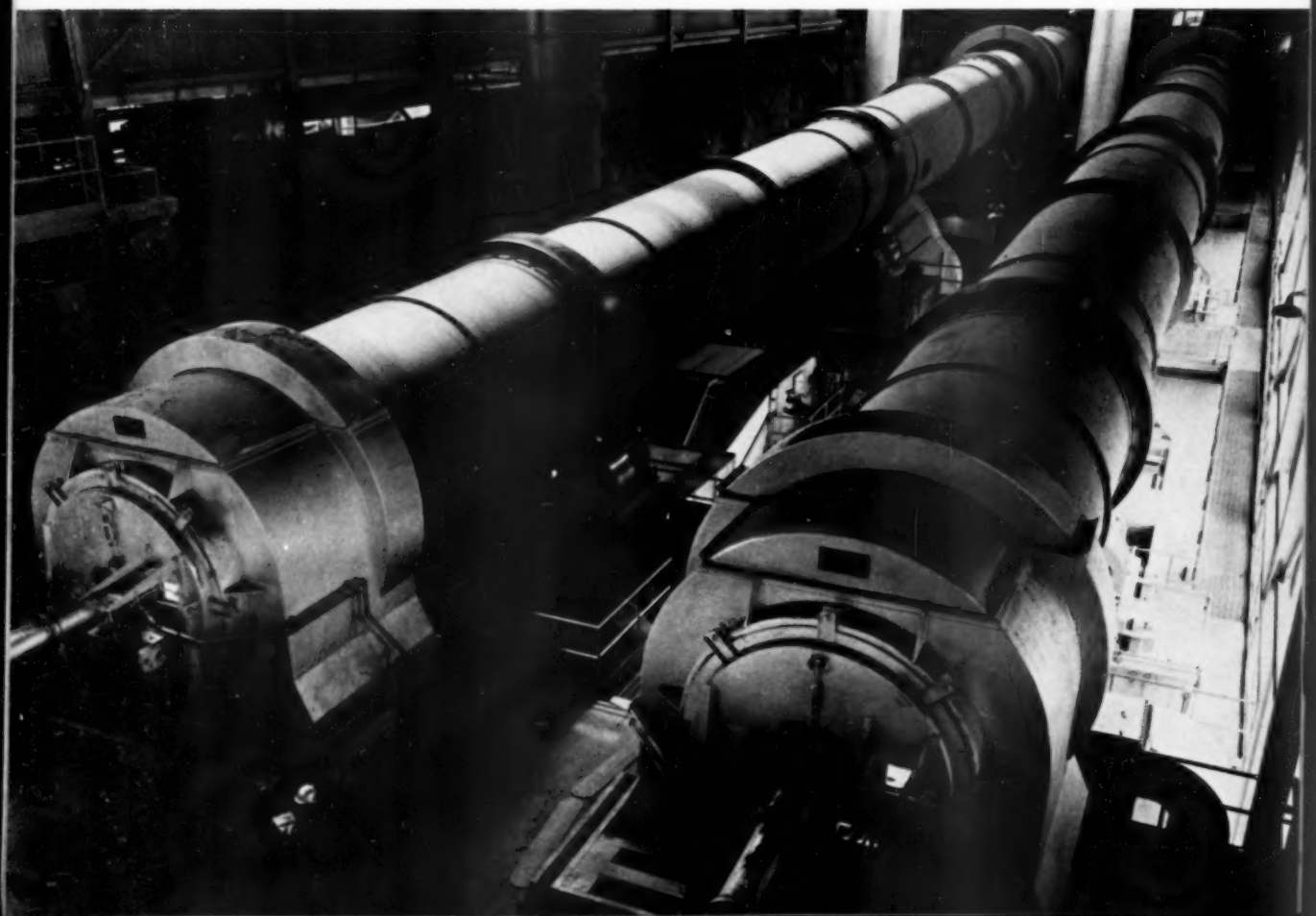
# ROTARY KILNS

**ARE USED BY THE WORLD'S BIGGEST PRODUCERS FOR OPERATING ECONOMY, LOWER MAINTENANCE AMD HIGHER PRODUCTION.**

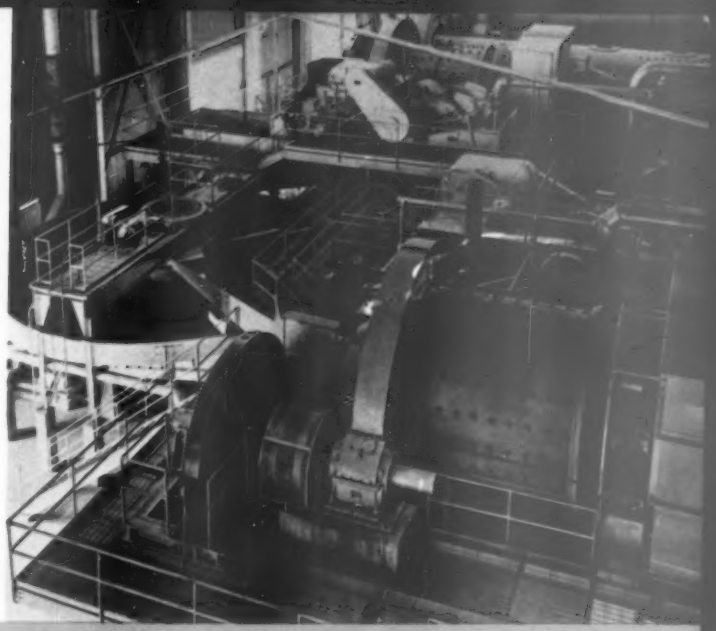
The modern design and engineering excellence of Traylor kilns is the result of over 50 years' experience in specializing in machinery for the mining and processing industries. The kiln shells are fabricated with heavy steel plate, automatically welded. Alignment is maintained by easily adjustable supports. The riding rings are full floating type, forged or cast steel, mounted on machined pads turned true and smoothly faced. The steel main gears and pinions are generated to a special design in Traylor shops and are reversible. Traylor kilns are available in any size depending on the specifications and capacities desired. Write, outlining your requirements, and our engineers will send you their recommendations and kiln Bulletin No. 1115.

SHOWN BELOW—two 11′ - 3″ x 300′ rotary kilns in a Pennsylvania cement plant.



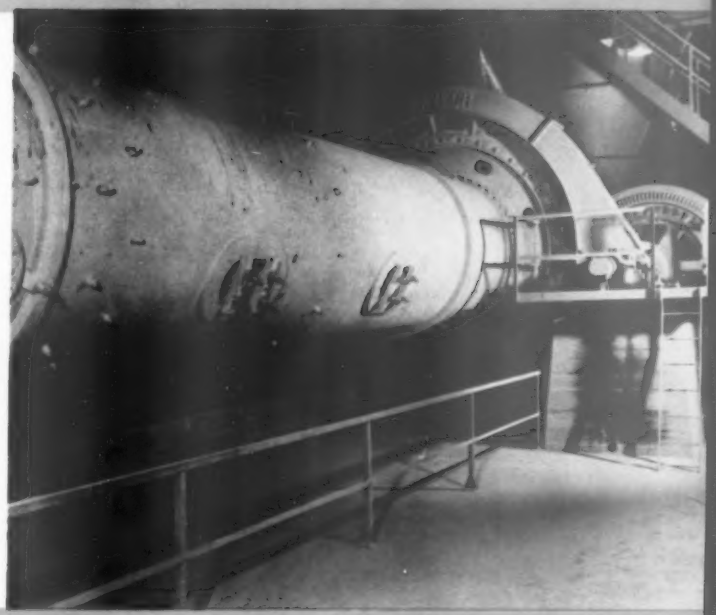
## BALL MILLS

Traylor ball mills are made in both overflow and diaphragm discharge types. Shells are welded steel with detachable heads of cast steel. These modern mills grind efficiently to 200, even 325 mesh.



## COMPARTMENT MILLS

Mills can be made in compartments, partitioned by suitably slotted diaphragms to separate different size grinding media, allowing the product of each compartment to advance to the next grinding stage within the same machine. Several operations are completed with a single source of power and drive.



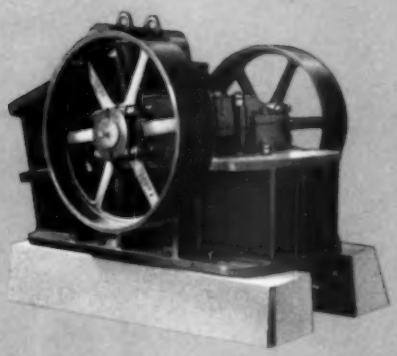
## COOLERS AND DRYERS

Traylor rotary coolers are made in the conventional, diaphram and multiple tube design and employ the same construction features as Traylor kilns. Rotary dryers, direct or indirect fired, are designed to meet specific requirements.

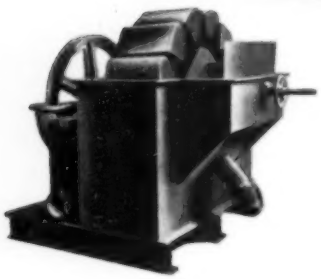
# GYRATORY CRUSHERS

Traylor is the world's largest manufacturer of giant 60" gyratory crushers and is equally famous for fine reduction crushers. All gyratory crushers are built with Traylor's famous original bell heads and curved concaves. Application of power as a direct crushing force drastically reduces power requirements at all settings. Write our engineers outlining your requirements.

# JAW CRUSHERS



**The features of the Traylor jaw crusher include the original curved jaw plates allowing for greater capacity at finer settings resulting in longer life of wearing plates. The frames are reinforced at critical points to provide strength. All the parts in a Traylor jaw crusher are readily accessible. Write, outlining your product size and capacity requirement, and our engineers will send you their recommendations.**



# FEEDERS

Traylor feeders for wet or dry materials in open or closed circuit operation.

### SLURRY FEEDERS

A self-contained, fully closed ferris wheel type feeder for accurately supplying constant volume of slurry to kilns and mills. The tank and hopper are a single welded unit. Sizes from 36" to 84".

Write for Bulletin No. 2114 for details on feeders.

### TABLE FEEDERS

For accurate regulation of feed to mills, kilns and dryers. The revolving table receives material at its center through an adjustable telescopic feed spout. The Traylor table feeders are built in sizes from 2' to 10' in diameter.

Traylor

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# WASHINGTON LETTER

by EDGAR POE

**Hundred Million Vehicles**

Commissioner Ellis L. Armstrong of the Bureau of Roads says the 41,000-mile network of Interstate highways will be built to standards which will handle the types and volumes of traffic predicted for the system in 1975. He said the Bureau is looking 15 years ahead to the time when at least 100,000,000 passenger cars, trucks and buses will be rolling, a 45 percent increase over the 70,000,000 on the go today.

Bureau officials said that a tremendous amount of concrete and asphalt will be used for maintaining the road system ahead. Today the Federal aid highway "plant," including the Interstate network, is 810,000 miles in extent. These 810,000 miles by 1971 will carry an estimated 70 percent of the total motor vehicle traffic.

"No wonder," said the commissioner, "our highway program now ranks with such major undertakings as education, public health and national security."

**Series of bills Seek to broaden Social Security**

Some protection against loss of income, disability and retirement is now provided for about 85 percent of the nation's labor force under the Social Security Insurance System. The railroad retirement system and other public retirement systems provide for an additional 8 percent.

A total of 13,750,000 men, women and children are currently being paid $850,000,000 monthly by the Social Security Administration from the taxes it has collected, brought to Washington and returned. A year from now 14,100,000 persons will be receiving monthly benefits.

Dozens of bills are pending in Congress in one shape or another that would liberalize the social security program, this being a big election year. They would remove the $1,200 a year ceiling on earnings of persons receiving social security; permit men to receive reduced benefits at the age of 62 (now 65) and women at 60 (now 62); eliminate the minimum age of 50 years for persons seeking disability benefits, and establish special social security tax credit for employers hiring workers 45 years of age or older.

One of the most liberal of the pending measures, and one that has substantial backing, would provide medical and hospital insurance to America's retired workers. The Eisenhower Administration is supporting it; the American Medical Association is against it.

**Government Recruits Scientists**

The marked growth in engineering and scientific activities that began a decade ago is continuing unabated. The government is continuing this year at an accelerated rate its recruitment program.

The reason that the recruitment program is continuing is because of the fact that Congress is appropriating billions of dollars for research and production. One in every 10 of the Government personnel is currently employed in either a scientific or technical position.

In order to recruit the engineers, etc., Uncle Sam has upgraded the positions. It is estimated that there are more than 82,000 engineering personnel now employed by the United States government.

**Clarify Taxes**

Taxation by a state of the income of a company in interstate commerce is curbed by a law passed at the closing 1959 session of Congress. However, the act does not completely clarify the tax status of carriers and firms operating across state lines. Nevertheless it is intended to protect from double taxation of state taxes those companies with no offices, warehouses or other places of business in the taxing state.

A House Judiciary Subcommittee, headed by Representative Edwin E. Willis of Louisiana, plans to come up with a bill of clarifying amendments on the tax question in the new session. Meantime, if a company merely takes orders in a given state, that state is not allowed under the 1959 legislation to tax the company income.

**Many new Post Office Buildings**

Planning will be started on additional buildings to be constructed in the immediate years ahead. Major renovation and air-conditioning of Federal buildings will continue. GSA also plans to carry on a new fallout shelter program at certain Federal relocation sites and in some existing Federal building.

Under the Post Office commercial leasing program, an estimated 1,400 buildings costing $67 million will be built in 1961 by private interests for long-term occupancy.

The Housing and Home Finance Agency provides grants, loans and loan guarantees to communities to promote slum clearance for redevelopment by private interests. The blue-printed expanded program starting July 1 calls for speeding progress on existing projects. By the end of the next fiscal year, 61 urban renewal projects will have been completed and 510 will be under way.

**Contractor Competition Holds down cost**

A spokesman for the Associated General Contractors of America, Max C. Harrison, declares the cost of highway construction is less than 3 percent above 1953. Testifying before the House Public Works Committee, Mr. Harrison said that with 1953 as the base year, contractors' bid prices have risen but 2.7 percent. At the same time, he said average earnings of hourly employes in highway construction have increased 33.4 percent and material costs have gone up 20.2 percent. He maintained that keen competition among contractors have held down construction costs.

Then the president of Harrison Construction Co. of Pittsburgh, Pa., and Alcoa, Tenn., gave the industry another warm pat on the back: "Highway construction today is probably the best buy the public receives for its tax money."

**World road Building to Top 1959 peak**

A record total of the free world's spending on highways was established in 1959, and still another record apparently will be set in 1960, the International Road Federation's survey of 144 countries and territories around the world shows. Total construction expenditures for construction, maintenance and administration totaled an estimated (US) $18.6 billion compared with $17.13 billion in 1958.

The International Road Federation's survey shows that the United States proposes to spend nearly 10 times more on roads than any other country during 1960. The 20 leading countries are:

(1) United States $11,500,000,000; (2) Canada $1,350,000,000; (3) West Germany $1,000,000,000; (4) France $750,000,000; (5) Britain $550,000,000; (6) Japan $450,000,000; (7) Italy $350,000,000; (8) Australia $350,000,000; (9) Brazil $250,000,000; (10) India $200,000,000; (11) Sweden $195,000,000; (12) Switzerland $150,000,000; (13) Venezuela $150,000,000; (14) Austria $120,000,000; (15) Finland $115,000,000; (16) Norway $110,000,000; (17) Mexico $95,000,000; (18) Union of South Africa $95,000,000; (19) New Zealand $78,000,000; (20) Argentina $75,000,000.

**Asphalt tests Underway in Arid West**

Prefabricated sheets of burlap coated with asphalt are being tested by the Department of Agriculture as a practical and long-lasting liner for irrigation canals in the semi-arid West, because about two-thirds of all irrigation water is lost because of seepage and run-off.

Results will not be available until the material has been tested a year or more. The liner was prefabricated by coating each side of 15-ounce burlap with asphalt, producing a thickness of about three-eighths of an inch. The burlap was treated chemically to inhibit rotting. Sheets of the asphalt-burlap were laid directly on the soil in the irrigation canals.

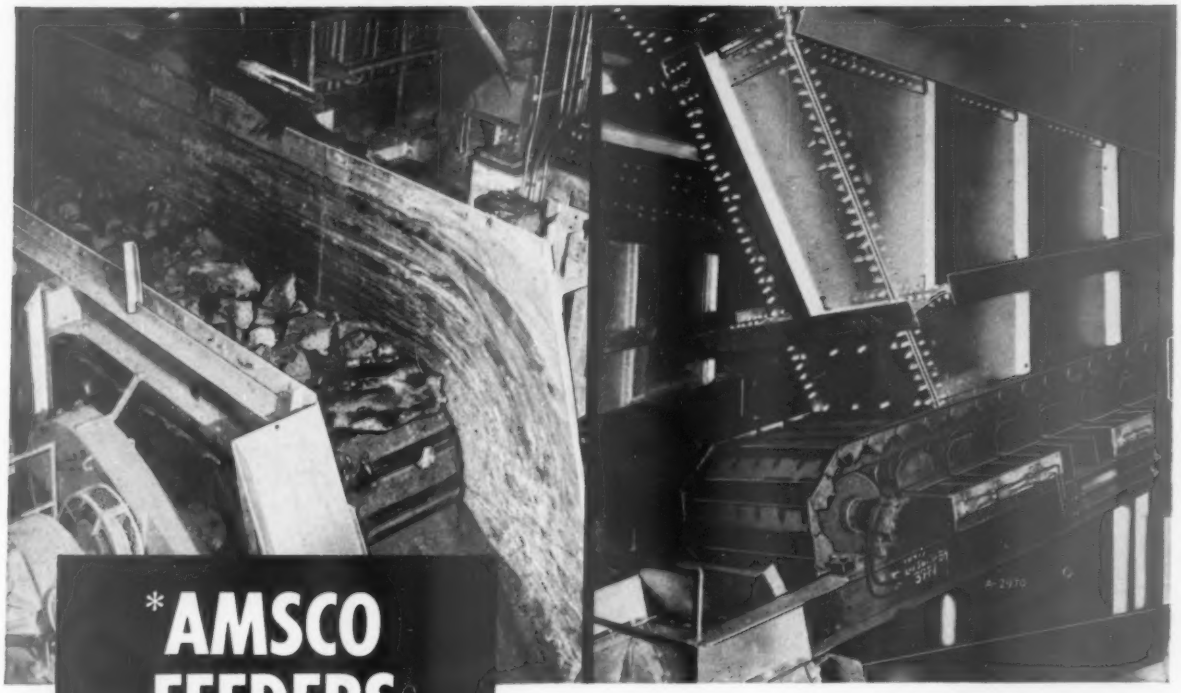
A thin layer of clay emulsion, sprayed like paint, is the only cover being used over the otherwise exposed asphalt-burlap material. This treatment slows asphalt deterioration. The asphalt-burlap lining is expected to cost about $1 per sq. yd.

**Bill would Make secondary Boycott legal**

A measure that would legalize the secondary boycott in the construction and building industries generally appears unlikely to reach the floor of the House. There is little sentiment for the bill.

Frank J. Rooney of Miami, Fla., past president of the Associated General Contractors of America, told the House Labor Committee that if the bill should become law it would wipe out "much of the good accomplished" by passage of the Landrum-Griffin Labor Reform bill at the 1959 session of Congress. He declared the proposal would result in labor unrest and encourage strikes and picketing in construction, rather than confine disputes to the interested parties.

# STEPHENS-ADAMSON



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*Reg. T.M. American Manganese Steel Co.

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# LABOR RELATIONS

A ROUNDUP OF ACTUAL DAY-TO-DAY IN-PLANT PROBLEMS AND HOW THEY WERE HANDLED BY MANAGEMENT MEN

## How would you decide?

### Can a union officer be disciplined for spending too much time on union business?

*What Happened:* Jake Foster was the president of his local and he took his job seriously. Last year, as a result of his zeal, he was absent 25 days and late on the job 20 times. This irked management, but the foreman never took occasion to bring the matter to a head.

"He'll hang himself," was the way the supervisor put up with Jake's absenteeism and lateness. The foreman was sure this would happen because of a clause in the union contract which gave the management the right to discharge workers for excessive absences after a warning. There was also a rule in the handbook that any worker contemplating being absent must tell his foreman in advance.

At any rate, Jake was busy as a bee on union business. He took time off to go to the union convention. He was absent during negotiations. He took time out to help his union prepare NLRB cases. He met with company people to discuss Blue Cross. He lost time working out layoff procedures during the recession. Finally he was given a warning and then fired. At arbitration he argued:

1. When I'm on union business I'm doing as much good for the company as for the workers. So you can't count that as lost time.
2. The company has no policy on "excessive absenteeism."

The company countered:

1. We can use our judgment on what "excessive" absence is. By any standard, 25 days is too much.
2. Jake never took us into his confidence. He just took off on "union business." What does that mean?

**Was Jake:**
**Right?** ☐ **Wrong?** ☐

*What Arbitrator Sugarman ruled:* "Whatever the cause or circumstances, Mr. Foster decently owed supervision a more thorough, prompt and cooperative accounting of his time—in advance where at all possible, and in any event, after the absence. Effective personnel and labor relations might have been better advanced in this situation if a bit more day-to-day friendly firmness of administration had been applied by management, and if a bit more respectful frankness had been shown by Mr. Foster as an employe with plant obligations paralleling his official union duties. Because of the company's laxity, which permitted Mr. Foster to continue his tardiness and absenteeism without having to account for them, I feel that discharge is too severe. He should be reinstated with 75 percent of his lost earnings as back pay."

### Can you discipline an employe by demoting him to a lower-paid job?

*What Happened:* It was a holiday but

Foreman Jones found it necessary to call in the maintenance crew. The men didn't like the idea of coming in and the biggest "beefer" of all was Walter Raskin. He was the leader of the maintenance crew. So it was his job to hand out the work, to check up on progress made and report to the supervisor.

In this emergency Walter fell down on the job. The work just never got done on time. Foreman Jones felt that this failure was caused by the attitude Walter had. The supervisor was sick and tired of this kind of "progressive inefficiency" and decided to teach Raskin a lesson. He demoted him to a line operation at a 15¢ an hour cut.

In spite of Raskin's protest, the company backed up the supervisor's action.

**Was Raskin:**
**Right?** ☐ **Wrong?** ☐

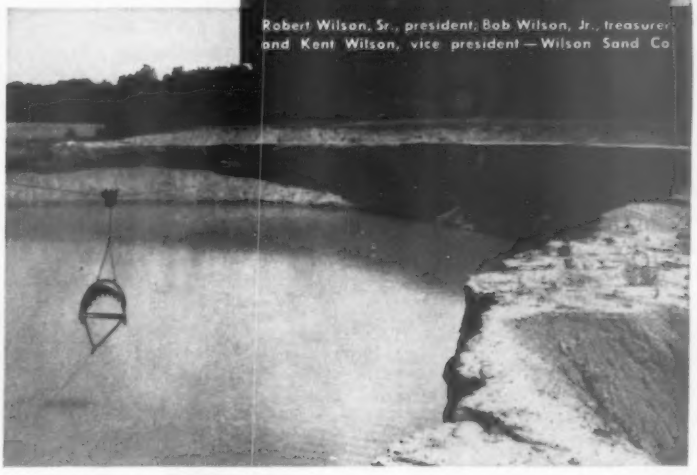
*What Arbitrator Reid ruled:* "Arbitrators, as a general rule, will not permit management to use demotion as a form of discipline unless the agreement specifically provides for such—for to do so would abridge the seniority rights granted by the contract."

*(Continued on page 26)*

# Sauerman DragScraper Digs and Hauls from Pit to Hopper for 8¢ Per Yard

Robert Wilson, Sr., president; Bob Wilson, Jr., treasurer; and Kent Wilson, vice president—Wilson Sand Co.

Track Cable DragScraper inhauling load to hopper from 40 ft. below water.



DragScraper and carrier returning to pit by gravity. Average haul is 500 ft. on a 675-ft. span.

Operating costs for Wilson Sand Co.'s new Sauerman DragScraper are estimated to be less than 8 cents per yd. This includes labor, maintenance and power costs to dig from 40 ft. below water level and deliver 90 yds. per hr. to the field hopper on an average haul of 500 ft.

Wilson Sand Co.'s new 125-tph. plant represents a steady increase in capacity which started with 20 tph. in 1939, using a small Sauerman Slackline.

Sauerman equipment has kept pace with the growth of their Upper Sandusky, Ohio plant. The Slackline was replaced by a 1½-yd. track cable DragScraper in 1951, and with a 2-yd. machine in 1953. The new Sauerman unit is a 3-yd. track cable DragScraper operated by a two-drum electric hoist equipped with air controls.

The DragScraper is digging 35 to 45 ft. under water down to bed rock on a 675-ft. span. The pit bank stands 40 ft. above the water, thus total depth of the deposit recovered by the DragScraper is about 85 ft.

Excellent material and the right equipment to dig and process are responsible for the continued growth of the Wilson Sand Co. Officers of the company are Robert W. Wilson, Sr., President, Kent Wilson, Vice President and Bob Wilson, Jr., Treasurer.

You can cut *your* costs by digging and hauling with a Sauerman Machine sized to match your plant capacity. Track cable Drag-Scrapers dig from high banks, dry pits and deep water. They are built in sizes up to 15 yds. and operate economically on 1000-ft. spans. Start reducing your operating costs—write or call and tell us your job requirements.

After discharging load into field hopper, DragScraper is lifted from pile for return to pit. Conveyor at left leads to plant.

This Sauerman two-drum hoist controls operation of DragScraper.

**SAUERMAN BROS., INC.** 630 SO. 28th AVE. BELLWOOD, ILL.

*Linden 4-4892 • Cable CABEX—Bellwood, Illinois*

Crescent DragScrapers • Slackline and Toutline Cableways • Dorolite Blocks

*Enter 1008 on Reader Card*

(Continued from page 24)

**Can an employer refuse to let a high union official visit the premises?**

*What Happened:* Max Winkle was a business agent for a union. It was his practice to visit the premises of the employer in order to handle employe grievances. During one of his visits he got into a verbal tiff with the president of this small company. He raised his voice and even walked around the desk and talked into the boss's face.

"Don't you come around here any more," the boss said. "I don't want any such fresh guys like you around here."

"I represent these employes and you can't keep me out of here," Max hollered at him.

When Max showed up the following week, the boss called the police and had Max escorted to the gate. The union took the case to arbitration on the grounds that the employer must permit access to union representatives if the contract is to be properly carried out. It argued that if Max is barred, then the employer can do the same to others and thus stymie the processing of grievances.

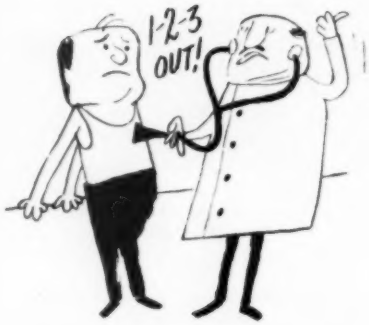
**Was the union:**
**Right?** ☐ **Wrong?** ☐

*What Arbitrator King ruled:* "Mr. Winkle is not an unsophisticated, uneducated shop worker who might be expected to give vent to emotional outbursts under pressure. On the contrary, he impressed the Arbitrator as a man very well trained in the business in which he engaged—intelligent, articulate, extremely self-confident and entirely capable of self control.

He knew that any grievances that could not be satisfactorily settled with the company could be taken to arbitration, but he preferred to create an air of intimidation in his discussion with the employer. That this was his preference is indicated by his testimony that he stepped around the desk and talked into the employer's face because it was something he often did. Whether this was Mr. Winkle's usual manner of discussing a grievance or not, it was the kind of conduct which the employer had a right to resist, and if need be, with force.

"Across an office desk is close enough for collective bargaining; to move around a desk toward the other party in the midst of a heated discussion can have only one purpose—the use of force or a threat of the use of force. Neither Labor Relations nor labor unions can afford to condone such conduct—to do so is to invite public censure. It is the finding of the Arbitrator that Mr. Winkle's conduct justified the company in refusing him access to the premises."

**Should a company rehire a worker who has had 3 heart attacks?**




*What Happened:* When Paul Smith had his first heart attack he was out for several months. When he returned he was examined by the company doctor who suggested that Smith be given lighter work. This the company did.

In the following year, Smith suffered two other heart attacks. Before he was allowed to return to his job after the third illness, the management suggested a complete examination by the company doctor. The medic's diagnosis was not encouraging. Mr. Smith was suffering from an acute heart condition and the doctor felt that it was inadvisable to rehire the man.

But Smith insisted that he get his job back. He said he felt fine, that his work was not taxing and that he could still carry his load. Smith further produced the testimony of his own doctor who disputed the findings of the company physician. True, Smith did have a heart condition, he agreed. But it was necessary to his mental health to have something to do.

The union suggested that a 3-man board of doctors be appointed to decide the issue. The company said "no." It maintained that its staff doctor was reputable and it would abide by the decision not to rehire Smith. The case went to arbitration on the issue whether the company could stick by its own doctors or must submit to a group of outsiders in deciding what to do with this problem about Smith.

**Was the company:**
**Right?** ☐ **Wrong?** ☐

*What an Arbitration Board ruled:* "... since there is no evidence that the company did not act in good faith and there is no suggestion of discrimination against Mr. Smith, the company was entitled to rely, as they did, on the advice and the conclusions of its own medical advisers."

**Is an employe on excused sick leave entitled to holiday pay?**

*What Happened:* The company paid for 6 holidays a year. Its policy was typical—employes were entitled to holiday pay except for those who were absent the day before or the day after the holiday with no adequate excuse.

Emma Prag was on excused sick leave. During her leave, Easter Sunday came up as a paid holiday. She claimed pay for it:

1. I am on excused sick leave. I am entitled to all privileges of regular employes.
2. I had an adequate excuse for not working the day before and the day after. I was on leave.
3. If I were on vacation I would be entitled to the extra money. So why shouldn't the same rule apply in the case of "excused leave"?

The company answered:

1. Emma wasn't on the payroll and isn't entitled to holiday pay.
2. Holiday pay presumes that a worker has put in some hours during the week. Emma was out all week.
3. In the past we have had similar cases and not paid for the holiday. Emma is trying to make us break a precedent.

**Was the company:**
**Right?** ☐ **Wrong?** ☐

*What Arbitrator Prasow ruled:* "Because the contract is silent on the issue of holiday pay for employes on excused leave, the Arbitrator must look to past practice. Company records show that from the years 1952-58 there were over a hundred instances of excused leaves which did not get holiday pay. Therefore, past practice must prevail. Emma Prag is not entitled to holiday pay while on excused leave."

**END**

# NOW the month for BARGAINS

## IN USED EQUIPMENT AT YOUR CATERPILLAR DEALER!

**• BIG SELECTION! • ALL MAKES! • ALL MODELS!**

**• PRICED TO SELL! • CONVENIENT FINANCING!**

The biggest values you've *ever* seen in used equipment—nearly all makes, all sizes, all conditions—honestly described and rock-bottom priced. May is bargain month at your Caterpillar Dealer. He's taken in a lot of trades. He's offering the biggest bargains in his history. He'll deal—with financing tailored to your needs!

***Top values with written protection!***

No guessing or gambling at your Caterpillar Dealer. He reconditions, classifies and guarantees his trade-ins to take the risk out of your buying. Cream of his crop are "Bonded Buys"—the highest quality, most productive used Caterpillar equipment money can buy. Carefully checked and overhauled, "Bonded Buys" are backed by his written bond up to $10,000, assuring you parts and service protection during the warranty period. He has other classifications of used equipment, too—priced right to assure you top value!

***First come—first served!***

Whether you're adding to your line-up or just going into business, here's an opportunity you can't afford to miss. First come, first served—so don't delay. Visit your Caterpillar Dealer's lot today!

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

**CATERPILLAR**

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

**BEST USED EQUIPMENT BUYS ANYWHERE**

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# PEOPLE IN THE NEWS

## Director of advertising for Lone Star

THEODORE PRICE (above) has been appointed director of advertising and publicity for Lone Star Cement Corp., New York, N.Y., and John Peter Flynn has been named advertising manager. Mr. Price has been supervisor of the Lone Star account at Donahue & Coe advertising agency. Mr. Flynn was Lone Star's assistant publicity manager. Both are newly created posts.

## Hogberg heads Michigan Limestone Division

CARL G. HOGBERG has been appointed president of the Michigan Limestone Division of U. S. Steel Corp., succeeding Christian F. Beukema, who was recently named president of the Oliver Iron Mining Division. Lloyd S. Campbell, formerly assistant to the vice president of operations of the Oliver Iron Mining Division, has been made vice president of the Michigan Limestone Division.

Mr. Hogberg became associated with U. S. Steel in 1935 as a blast furnace apprentice at South Chicago Works. He moved to Detroit in 1955 as assistant to the vice president of the Michigan Limestone Division, was named assistant vice president a year later, and in 1957 became vice president. In 1945 Mr. Hogberg received the J. E. Johnson award of AIME, and in 1950 was honored for his technical contributions to the industry.

Mr. Campbell, a native of Kingston, Ontario, Canada, was graduated from the Michigan College of Mining and Technology, Houghton, Mich., with a degree in civil engineering. He joined the Oliver Iron Mining Division in 1936, was promoted to assistant general superintendent of the Eastern district in 1952, and became assistant to vice president—operations in 1956.

## Flintkote elects new vice presidents

KENNEDY ELLSWORTH, Wm. Wallace Mein, Jr., and Noel J. Redmond have been elected vice presidents of The Flintkote Co., New York, N.Y. Mr. Ellsworth is general manager of the U. S. Lime Products Division, which was acquired by Flintkote in September 1956. Mr. Mein is president of the Calaveras Cement Division, acquired in September 1959, and Mr. Redmond, a Flintkote director, is president of the Blue Diamond Division, acquired in May 1959.

## American Aggregates names Toops plant manager

GERALD TOOPS, formerly assistant manager, has been named manager of the Columbus, Lockbourne and Newark, Ohio, plants of American Aggregates Corp., Greenville, Ohio. He succeeds W. E. Pohlman who has retired after 31 years of service to become vice president and general manager of the Columbus Bituminous Concrete Corp. of Columbus. E. N. Bernhardt, Jr., who has been associated with an eastern sand and gravel producer, succeeds Mr. Toops as assistant manager.

## Hawaiian Cement names Starke executive vice president

HOWARD R. STARKE has been named executive vice president and general manager of the Hawaiian Cement Corp., Honolulu, Hawaii. He has been serving as vice president and technical director of the company, and also has held the same positions with Riverside Cement Co., Riverside, Calif., where he will continue to be available as a consultant.

Mr. Starke, a native of Tarentum, Pa., and a graduate of California Institue of Technology, has been with Riverside since 1927, starting in research and development, then as personnel manager and later as general superintendent. He was made vice president and technical director in 1956.

## Livingston Rock elects president

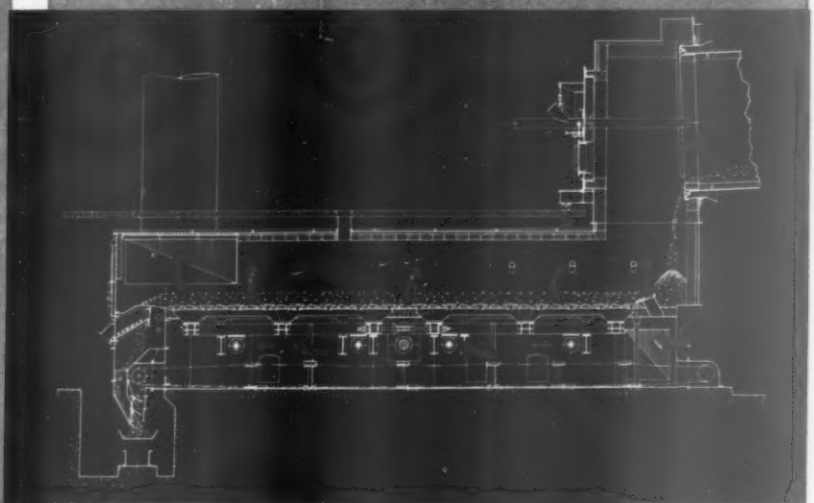
MERRILL L. NASH has been elected president and chief executive officer of the Livingston Rock and Gravel Co., Arcadia, Calif. He has also been named a director and general manager of Triangle Rock Products, Inc., Arcadia. Terrance C. Ellis has been elected treasurer of both companies.

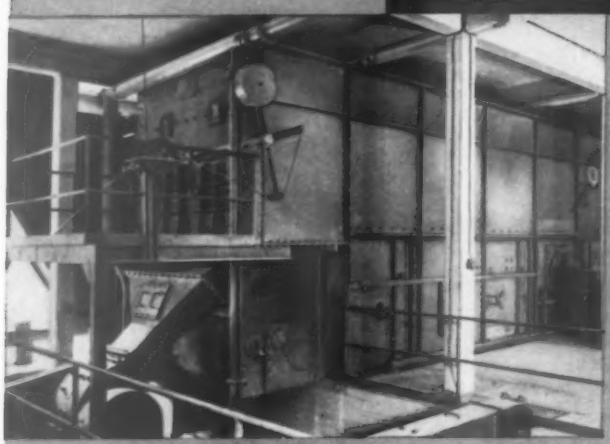
*(Continued on page 30)*

# Smidth FOLAX

## HORIZONTAL GRATE COOLER

**FOR CEMENT CLINKER**





**First Folax Horizontal Grate Cooler installed in 1947. Thoroughly proven design—more than 160 Folax Coolers sold and in operation.**

- **Extra heavy construction.**
- **Efficient cooling to low temperatures.**
- **Bulletin No. FC1059 on request.**

**F. L. SMIDTH & CO.**

INCORPORATED

ROCKEFELLER CENTER

1270 Ave. of the Americas, New York 20, N. Y.

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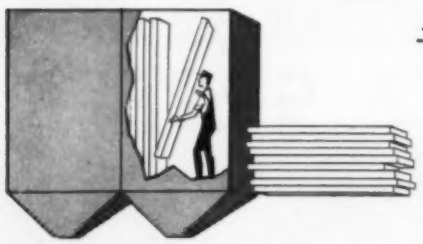
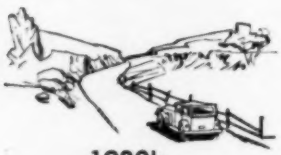
SINCE 1874 SLY

# SLY DUST FILTERS For ACCESSIBILITY



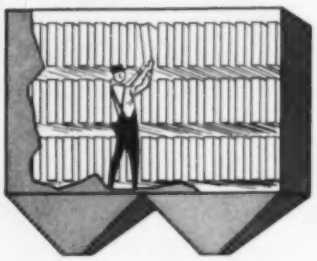
1900's
SLY DUST ARRESTER

Every cloth screen from the end of the arrester had to be removed to reach the faulty screen.



1930's
SLY TUBE-TYPE FILTER

To replace a tube required at least partial disassembly of every other tube in the way.



TODAY
NEW SLY
"ROLL-CLEAN"
DYNACLONE®

Any filter bag is easily accessible and can be replaced without need for removing others.

## NEW SLY DYNACLONE PROVIDES FASTEST, EASIEST BAG CHANGING

*Whether you change one bag, or the entire filter,* you do it in less time with the Dynaclone. Quick replacement of individual bags eliminates the need for costly rebagging should only a few be worn. Complete change is also fastest . . . the Dynaclone has only one half as many bags as other filters with the same cloth area. In addition . . .

*New "Resist-O-Wear" bags offer* 200 to 300% more bag life.

*The Dynaclone operates continuously.* It provides complete dust suppression through constant suction.

*The Dynaclone is automatically self-cleaning by reverse air.* A single exhaust fan provides *both* suction for dust collection and air for bag cleaning. No auxiliary blowers required.

*And the Dynaclone provides 20 to 40% more cloth* in a given space than other makes of dust filters.

The Dynaclone has been proved in more than 1,000 installations. Investigate its advantages on your applications . . .

*SEND FOR 36-PAGE CATALOG 104*

**THE W. W. SLY MANUFACTURING CO.**

4746 Train Avenue • Cleveland 1, Ohio • Offices in Principal Cities • Overseas Licensee: Andrew Air Conditioning Ltd., London S. W. 1, England

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## PEOPLE IN THE NEWS

*(Continued from page 28)*

### Standard Lime and Cement names Hobbs manager

JOHN O. HOBBS has been named manager of building materials sales, Standard Lime and Cement Co., Baltimore, Md. He was formerly assistant manager under Richard J. Troja, vice president, and will be succeeded in this position by Richard M. Bilger, a graduate of Cornell University.

Mr. Hobbs has been associated with the firm since graduating as a civil engineer from the University of Maryland and has been active in the cement industry since 1950. He is a member of the Maryland Association of Engineers and the American Society of Civil Engineers.

### Medusa promotes division manager

DOUGLAS C. GARDNER has been promoted to assistant general sales manager of Medusa Portland Cement Co., Cleveland, Ohio. He was formerly Toledo division sales manager and will be succeeded by James R. Strong, who has been serving as special representative in the Cleveland area.

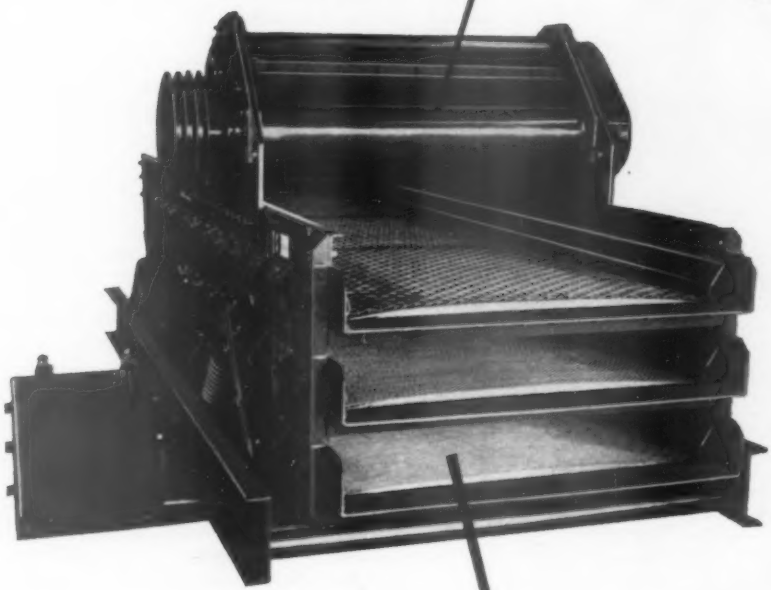
### Tom Robinson re-elected Association president

TOM L. ROBINSON, vice president of the Missouri Valley Limestone Co., Oakland, Iowa, was re-elected president of the Iowa Limestone Producers Association at its recent meeting in Des Moines. Joseph A. Madlom of Madlom Brothers, Edgewood, was named vice president.

*(Continued on page 32)*

# NEW SIMPLICITY HORIZONTAL VIBRATING SCREEN

## • CONVEYS AND SCREENS material in mining and gravel plants where minimum headroom is a problem



Simplicity Engineering Company has built a new horizontal vibrating screen, Model OA-95, designed to operate in mining and crushed stone plants where headroom is the governing factor. In this type of operation, it is necessary to both convey the oversize material and screen the undersize material. To do these two jobs successfully, the rugged shaft assemblies have two full length, cast alloy off-set shafts. These counter-rotating shafts, geared together, with heavy duty precision bearings that run in oil, provide the extra power needed to operate large screen areas on an efficient basis.

The Model OA-95 is equipped with a straight line deck designed to withstand the punishment of severe impact and loading stresses. The one-piece deck has all-welded construction and is stress relieved in an electric furnace to insure greatest strength and durability.

Available in sizes from 4′ x 10′ to 4′ x 16′, the new, 3-deck screen can be quickly converted to a two-deck unit by removing the center deck.

**For complete information on the OA-95 Horizontal Vibrating Gravel Screen and other screening equipment, scalpers, feeders and feeder grizzlies manufactured for the gravel and mining industries, write to Simplicity Engineering Company.**

**Simplicity**
TRADE MARK REGISTERED

**ENGINEERING COMPANY • DURAND 13, MICHIGAN**

**SALES REPRESENTATIVES IN ALL PARTS OF THE U.S.A.**
**FOR CANADA:** Simplicity Materials Handling Limited, Guelph, Ontario.
**FOR EXPORT:** Brown & Sites, 50 Church Street, New York 7, N. Y.

221

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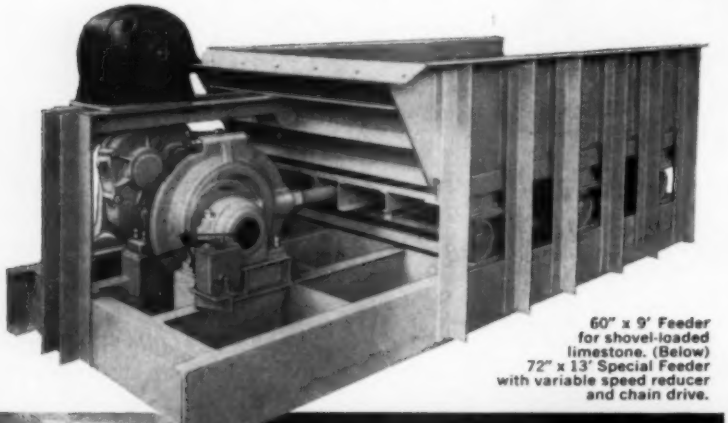
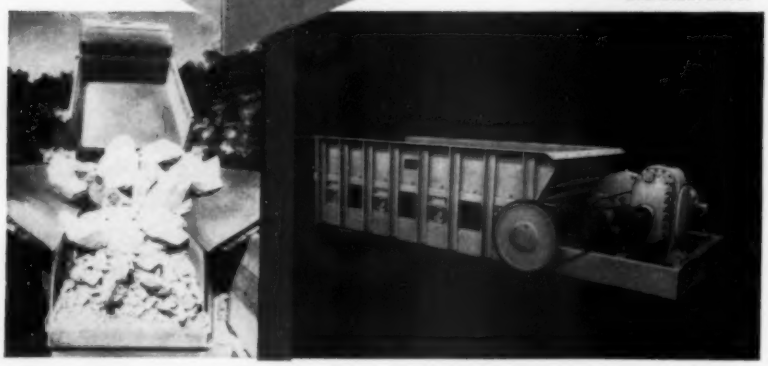
# LOW COST FEEDING

## from sand to shovel-loaded rock



60" x 9' Feeder for shovel-loaded limestone. (Below) 72" x 13' Special Feeder with variable speed reducer and chain drive.



Built for lower operating costs and long service, these machines feed uniformly controlled quantities of materials. *The result:* elimination of choke-ups, overloads, wear and tear on the feeder as well as on other plant machinery. *Get the facts from Bulletin FRE-57.*

McLANAHAN — SINCE 1835

**RECIPROCATING-PLATE FEEDERS**

**McLANAHAN & STONE CORPORATION**

252 Wall Street • Hollidaysburg, Pennsylvania

*Enter 1035 on Reader Card*


## PEOPLE IN THE NEWS

*(Continued from page 30)*

### Jacksonville district wins National Gypsum sales prize

FOR THE SECOND STRAIGHT YEAR the Jacksonville, Fla., sales district has won National Gypsum Company's top sales award—the Melvin H. Baker trophy. Here, Jacksonville district manager James E. Peeples, left, accepts the trophy from National vice president Melvin F. Cerruti at the awards dinner in Jacksonville.

### New Haven Trap Rock promotes McKeagney

ROBERT B. MCKEAGNEY, field engineer of the New Haven Trap Rock Co., New Haven, Conn., has been promoted to field sales manager, according to an announcement by Robert S. Reigeluth, president. In his new position, Mr. McKeagney will assist Edward T. Perry, vice president in charge of sales, in all field problems including sales of crushed stone, bituminous concrete, and sales for the construction division of the firm.

Mr. McKeagney, prior to joining New Haven Trap Rock Co., was managing engineer of the Asphalt Institute where he directed all engineering and administrative work in the 20 states along the East and Gulf Coasts of the United States.

### Clarence Gustafson to manage stone company

CLARENCE A. GUSTAFSON has been appointed general manager of the County Line Stone Co., Inc., Akron, N.Y., where he has complete charge of production, sales and future expansion programs. Mr. Gustafson recently resigned as production manager of Buffalo Crushed Stone Corp., Bowmansville, N.Y.

## Dundee general manager named vice president

ROBLEE B. MARTIN has been named vice president of Dundee Cement Co., Dundee, Mich., in addition to his duties as general manager. For the past year Mr. Martin has been supervising construction of the new $25 million plant in Dundee and the organization of the company in preparation for full-scale operations. Before joining Dundee, Mr. Martin was director of research and development for the Mississippi Lime Co., Ste. Genevieve, Mo., and a member of the general management committee. A native of St. Louis, Mo., Mr. Martin received his BS and MS degrees in chemical engineering from Columbia University.

Douglas C. Shanks has been appointed purchasing agent for the company. He formerly served in the purchasing department of General Mills.

## NCSA field engineer resigns

HOWARD M. BIXBY has resigned as field engineer for the National Crushed Stone Association to become project management engineer for the transportation division of the International Cooperation Administration, Washington, D.C. In his new position Mr. Bixby will plan, program and implement various highway, air field and waterway projects in any part of the world where the United States has a mission or a contract with a nation for technical assistance.

Formerly with the U. S. Bureau of Public Roads, Mr. Bixby joined the National Crushed Stone Assoc. in 1957.

## Lane named vice president

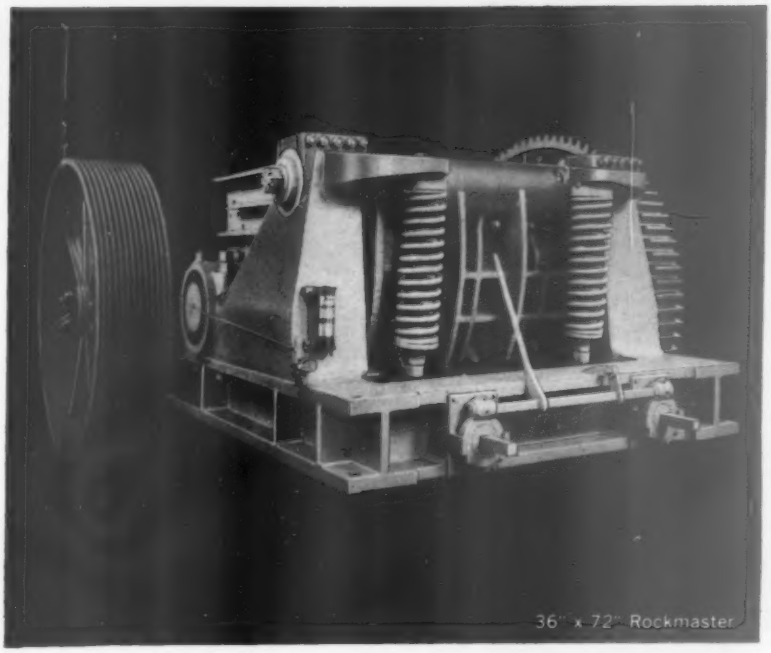
ELDON LANE has been named a vice president of the Stewart Sand and Material Co., Kansas City, Mo. He has been with the company since 1949 and before his promotion was general superintendent. George W. Garrett was re-elected president and W. J. Stewart, vice president.

## Schlitt will manage sand and gravel firm

HENRY G. SCHLITT, former deputy state engineer, has been appointed vice president and general manager of the Lincoln Sand and Gravel Co., Lincoln, Neb. He succeeds Warren T. Roberts, who will retire in June of this year.

END


world's MOST POWERFUL single-roll crushers




Widely used for primary and secondary crushing on the hardest and toughest kinds of shovel-loaded rock and ore, Rockmasters have high capacities and extraordinary ratios of reduction. Also they are the world's finest crushers for wet and sticky feed. Among outstanding design features: Automatic Steelstrut Toggle for release of tramp iron, and Quick-Adjustment for controlling size range.

*Get all the facts from Bulletin RMTD-56.*

SINCE McLANAHAN 1835

ROCKMASTERS

McLANAHAN & STONE CORPORATION

252 Wall Street • Hollidaysburg, Pennsylvania

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# New Task Force

## OUR "ROCK PRODUCTS CHEMICALS" TEAM

Dewey and Almy—long a leading name in rock processing products—now offers you the coordinated resources of its new "Rock Products Chemicals" team of chemists and engineers.

This team is at your service with information gained through practical field experience and laboratory research. Whether your immediate need is for grinding aids . . . air entraining agents . . . retarders or plasticizers . . . these skilled specialists offer you both the product and the know-how.

Dewey and Almy basic research brings constant improvements in the efficiency and versatility of chemical additives. The Rock Products Chemicals group translates these developments for your own use . . . and will spur *new studies* to meet your specialized needs.

To get details on how this new concept in rock processing products technology can serve you, write:

**W. R. GRACE & CO.**
**DEWEY AND ALMY CHEMICAL DIVISION**
*Cambridge 40, Mass. • Chicago 38, Ill.*
*San Leandro, Calif. • Montreal 32, Canada*

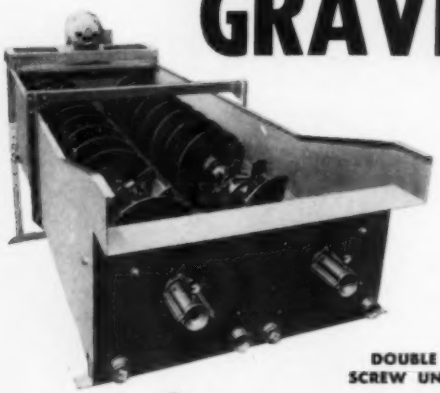
# to Serve You

Enter 1094 on Reader Card

Freeto Asphalt Co., Chanute, Kan., profits from Eagle experience and service—successfully processes gravel at low cost with Eagle Double Screw Coarse Material Unit which they have mounted on wheels for portability.

# WASH and DEWATER GRAVEL

## at surprisingly low cost with an Eagle coarse material washer-dewaterer



DOUBLE SCREW UNIT

SINGLE SCREW UNIT

Users back our claim that the most thorough, efficient and economical way to wash and dewater gravel is with an Eagle Coarse Material Screw Unit. The ideal combination of rising currents of wash water and scouring of the material by the corrugated paddles provides removal of soluble foreign matter—silt, clay, vegetation—quickly and continuously. Number of paddles supplied depends upon characteristics of your material.

Screw flights convey the washed gravel to the discharge at top of the tub, wringing out the water on the way. Material as large as 2½" readily handled. Single and double screw units, as shown. Special models for trash, shale and coal removal. The facilities of our laboratory and pilot aggregate plant are available without obligation to run tests of your material for determining just what you can expect from Eagle Fine Material, Coarse Material and Log Washers. Send 10 lb. sample. Ask for Catalog.

SINCE 1872

**EAGLE IRON WORKS**

*ENGINEERS • MANUFACTURERS*

*137 Holcomb Ave., Des Moines, Iowa*

EIW EAGLE IRON WORKS

FACTORY-TRAINED DISTRIBUTORS EVERYWHERE.

# INDUSTRY NEWS

## Lime record did not break—NLA says "It was shattered"

NATIONAL LIME ASSOCIATION, noting tentative results of the U. S. Bureau of Mines' monthly lime shipment canvass in December 1959, commented that the 1-million-ton shipment was unprecedented in the industry. "This did not just break—it shattered the previous monthly record of 859,000 tons set in August 1957," comments NLA's paper, Limeographs.

The December totals were the climax of two monthly upsurges from 681,000 tons in October and 825,000 tons in November, due largely to the end of the steel strike in November. Total lime shipments for the year may be 9,350,000 tons.

The association places the credit for the record lime shipment on steel production. December steel shipments also set an all-time high. "Furthermore," the article continues, "the lime factor in steel is increasing due to the oxygen lance and oxygen converter furnaces and sintering developments. Then, too, with all steel plants pushing for capacity production, lime requirements are always increased more in proportion in squeezing out those extra tons per heat."

## Percentage depletion decision in the offing

THE WEEK OF MAY 16 has been designated by the Supreme Court as the time it will hear the Cannelton Sewer Pipe Case. In notifying its members of the hearing, National Limestone Institute Inc. reported that the Department of Justice was to file its brief on behalf of the government around March 25.

Copies of the brief are available to NLI members who write to association headquarters, 1015 12th St., N.W., Washington, D.C. The House Ways and Means Committee has deferred action on percentage depletion until after the Supreme Court hands down its ruling in this case.

**Campbell's Texas, Md., quarry is typical** of the many Campbell operations that will add to Flintkote's reserves of nonmetallic mineral resources

## Acquisitions affect leading firms in rock industries

SEVERAL MAJOR ACQUISITIONS have been made in the rock products industries within recent weeks. Companies who have added substantially to their operations are Flintkote Co., American-Marietta Co. and American Cement Corp.

Flintkote Co. has made two acquisitions—its 10th and 11th in the last three years. They are Harry T. Campbell Sons Corp. of Towson, Md., and King Paving Co. Ltd. of Oakville, Ont. Both have subsidiaries that are included in the deals—for Campbell they are Clark Concrete, Inc., Teeter Stone, Inc., Clinchfield Sand & Feldspar Corp. and the Campbell Dry Mix corporations. King's subsidiaries are Nelson Crushed Stone Ltd. and King Building Materials Ltd.

American-Marietta Co. became the 7th largest cement producer in the U. S. by acquiring Dewey Portland Cement Co., which it will operate as a division, with Waldo E. Tyler continuing in charge. Completion of Dewey's new facilities near Tulsa this summer will bring that division's capacity to 7.2 million bbl., and A-M's to more than 22 million.

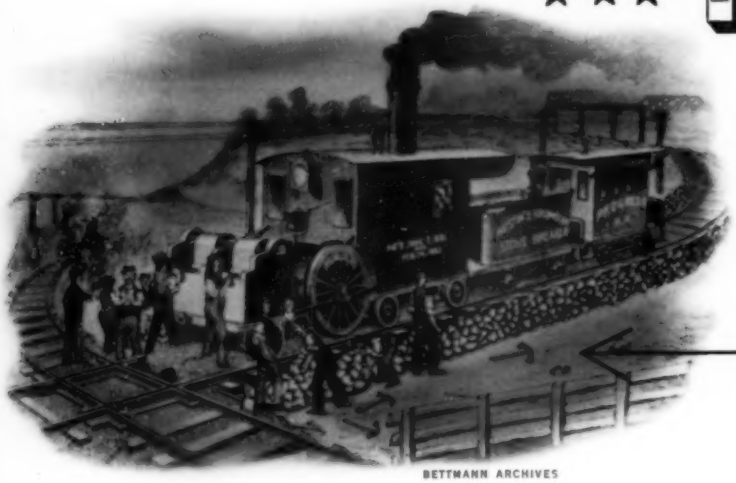
A second acquisition of American-Marietta's includes Beu and Sons Co. and Beu Limestone Co. of Grundy Center, Iowa. These activities will be incorporated into its Concrete Materials and Construction Division.

American Cement Corp., Philadelphia, has acquired M. F. Hickey Co., Inc., of New York City, and Graham Brothers, Inc., of Los Angeles, Calif. Both have been active in the ready-mixed concrete business for more than 40 years. Graham Brothers also is a large producer of sand and gravel and crushed stone in the Los Angeles area. The two companies will be operated as subsidiaries of American.

*(Continued on page 41)*

# "SHARP TOOLS!!"

## FOR 1893



BETTMANN ARCHIVES

*They had plenty of ingenuity in the old days—what they lacked was sharp production tools! This 1893 Locomotive Ballast Crushing Machine could run at 30 miles per hour, and change to a stone breaker in 5 seconds by raising the drive wheels off the track. The two hand-fed crushers could turn out a total of 25 to 30 yards per hour.*

## Today....

Cedarapids
Built by IOWA

Cedarapids
Built by IOWA

## Cedarapids gives you the

# SHARPEST PRODUCTION TOOLS

## to meet the toughest specifications at lowest cost per ton!

Gone are the days when road rock was merely broken into any old size, and often laid by the farmer to work out his road taxes.

Today, aggregate production is a fine art—roadbuilding is a precise science. To remain competitive you need the most sharply modern equipment design and engineering available. You need the sharp production tools Cedarapids gives you.

Stop a moment and think what it takes to make money in your aggregate producing business today. It takes crushers, screens, feeders, conveyors, washing equipment geared to enormous output—300, 500, 800, 1000 tons or more per hour.

It takes production units that will *meet the toughest specifications in roadbuilding history.* It takes portable plants, like the Commander above, to let you bid on the best jobs that may be hundreds of miles apart, and get you there fast—or stationary plants like the one at the left which are factory engineered by experts to handle your specific local job most productively. And to make money for you, this equipment *must produce at lowest cost per ton.*

Cedarapids equipment does! It gives you the capacity, the specification-meeting ability, and the operating economy you need to meet today's roadbuilding challenge with profit.

**IOWA MANUFACTURING COMPANY • Cedar Rapids, Iowa**

INS-15N

Printed in U.S.A.

# Torque-Arm

**THE DODGE DEVELOPMENT THAT CHANGED THE NATION'S HABITS OF SPEED REDUCTION**

*America's Most Complete Line of Shaft Mounted Speed Reducers*

**55 MODELS**

- Capacities up to 170 hp
- Output speeds from 10 to 400 rpm!
- Single Reduction
- Double Reduction
- 5 to 1 Ratio
- 15 to 1 Ratio
- 25 to 1 Ratio
- Any speed ratio up to 175 to 1 obtainable by selection of pre-determined combination of reducer and V-belt drive.

**CALL THE TRANSMISSIONEER**—your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look under "Dodge Transmissioneer" in the *white* pages of your telephone book, or in the yellow pages under "Power Transmission Machinery."

In fewer than ten years, the range of Torque-Arm Shaft Mounted Speed Reducers has increased from 6 to 55 models, to meet the ever increasing demand for this improved method of speed reduction.

By eliminating foundation, sliding base and flexible coupling this modern speed reducer has saved untold installation time and untold dollars of cost.

The rugged semisteel housing developed by Dodge has never been improved upon. It is corrosion resistant—and it has the strength to hold bearing seats in line for the life of the unit.

Dodge design provides wide spacing for the bearings. Loads are carried easily, contributing to Torque-Arm's long life and very high efficiency. The gears are finest quality—helical, heat treated steel.

Torque-Arm mounts vertically or horizontally in any position around the driven shaft. It locks to the shaft on *both* sides of the housing. The holes in the output hub provide simple removal with puller. Overload release and built-in backstop are optional.

Dodge Torque-Arm is America's most widely used shaft mounted speed reducer. It is stocked by your local Dodge Distributor. Ask him. Or write us for bulletin.

**DODGE MANUFACTURING CORPORATION, 2600 Union, Mishawaka, Ind.**

**DODGE**
*of Mishawaka, Ind.*

*Enter 1110 on Reader Card*

(Continued from page 37)

## Milwaukee site of AIEE cement subcommittee meet

MEETING MAY 17 AND 18 in Milwaukee's Hotel Pfister, the Cement Industry Subcommittee of American Institute of Electrical Engineers will consider topics in four major fields of interest: maintenance-safety, automation, drives and distribution. A session will be devoted to each category.

Six papers will be given at the session May 17 on automation. One of these will be "The 1960 Status of the Riverside Computer Installation," by LeRoy W. Weeks and Robert L. Boulden. Three panelists will participate in another discussion: "Developments in X-Ray Chemical Controls in the Cement Manufacturing Process during 1959 and 1960."

Marquette Cement Manufacturing Co.'s Milwaukee plant will be the subject of a paper by G. H. Ember at the session May 18 on distribution. He will talk about interesting features of the plant's electrical equipment.

## Cement plant outlays are charted for 1960 and beyond

IN SPECIAL ANNOUNCEMENTS and in their annual reports to stockholders, a number of cement manufacturers revealed plans to increase capacity or improve efficiency by major capital outlays. Among them: Riverside Cement Co., Universal Atlas Cement Division of United States Steel Corp., Bessemer Limestone & Cement Co., California Portland Cement Co., Arizona Portland Cement Co., Penn-Dixie Cement Corp., Lehigh Portland Cement Co., General Portland Cement Co. and Marquette Cement Manufacturing Co.

Riverside has awarded a contract for construction of a new white portland cement plant at its Crestmore, Calif., location. Initial capacity of the $5-million plant will be 250,000 bbl. Equipment ordered from F. L. Smidth & Co. includes a 9 x 253-ft. rotary kiln employing the latest preheaters and automatic controls. There also will be two grinding mills for raw and finished material, equipped with Symetrogear drives and 800-hp. motors. Unlike mills used in production of grey portland cement, these will use porcelain grinding balls and have a

(Continued on page 44)

BUILT TO DIG!
Long rollers and large idler sheave more adequately protect cable.
All moving parts greased.
Large diameter sheaves stay out of material, no pockets to collect material, causing cable or sheave wear.
Standard integral scoop stiffeners.
Contact design stops, no friction pads to wear.
Independent hinge suspension, scoops can dig individually.
Alloy treated lips with hard surfacing.
Wide scoops, large deck area for maximum cleanup ability.
"T" heads on pins can be reversed to distribute wear.
Correctly shaped scoops have no interior projections assure smooth fast dumping.
Full complement of five sheaves for fullest digging power readily adjustable to any lesser parts of line.
Integral sockets for complete adjustability of reeving.
Wedge and socket connections are easily reeved and connected.
WILLIAMS BUCKETS
Durable clamshell and dragline buckets for every application
Williams Bucket Division, The Wellman Engineering Company, 113 St. Clair Ave. N.E., Cleveland 14, Ohio
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Please send me the new Williams Bucket catalog.
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COMPANY
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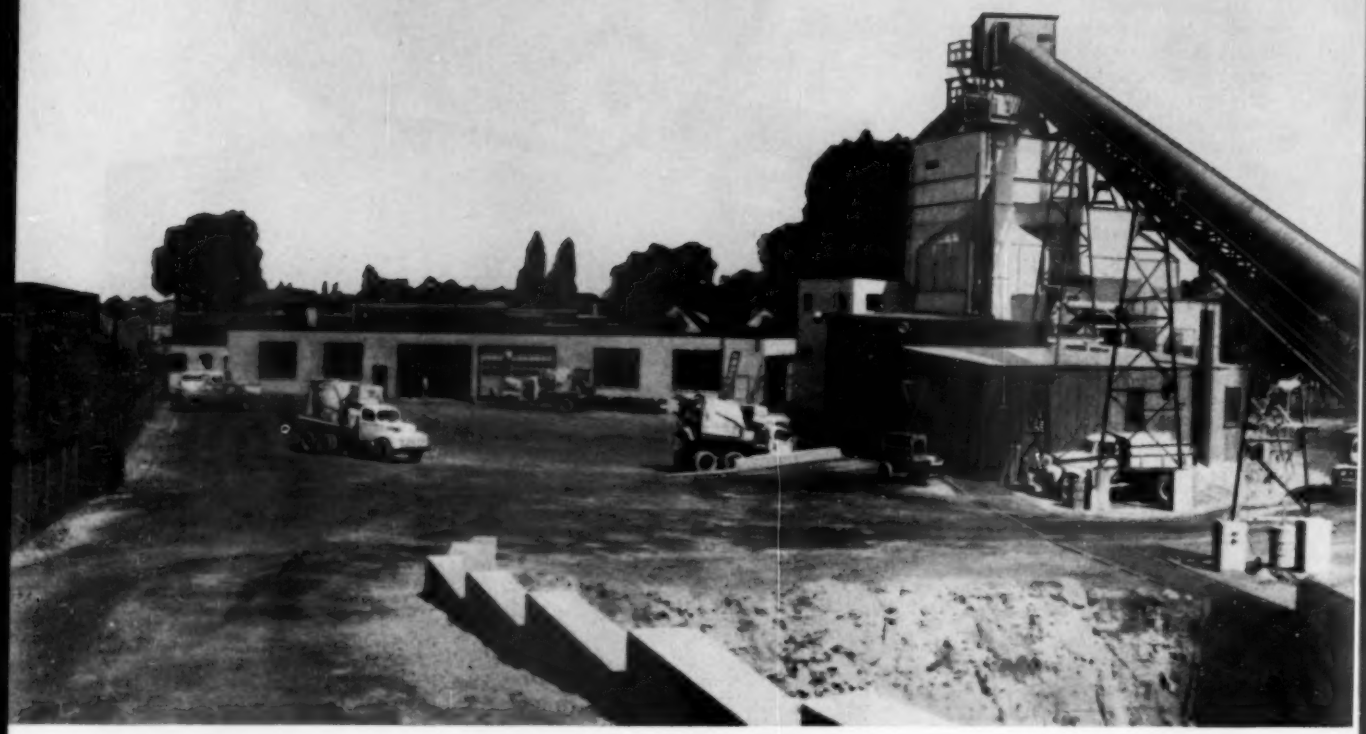
# How to get 60 minutes out of

## EVEN WHEN YOU'RE RUNNING 2 SHIFTS...



**SYNCHRONIZE COMPLETE PLANT OPERATION** Just as all the parts of a watch mechanism must function together to make it keep time accurately, so must all the various parts of your plant function together to produce the cleanest possible product in the fastest possible time. Check everything from pit to bins to make sure one piece of equipment is not creating a "drag", making it necessary for you to slow down your whole plant. Your profit picture for '60 will be no better than the slowest piece of equipment you own . . . so check now before you're into peak production.

**CARE and MAINTENANCE** Even the best equipment must have proper care and maintenance to do its best for you. You'll take a giant step towards beating the bug-a-boo of costly downtime by making sure your equipment is properly installed and properly serviced. Pay particular attention to moving parts. Follow the lubrication recommendations of the manufacturer and you'll be on the road to better performance.

**GET RID OF WEAK SISTERS** A chain is only as strong as its weakest link. One misfit or worn-out piece of equipment in your plant can cost you profit dollars way in excess of the replacement cost. Look at the big picture . . . what production do you want out of your plant? O.K. then what pieces of equipment are likely to create a bottleneck preventing you from reaching this goal? It's just that simple . . . get rid of that equipment . . . you can't afford to keep it!

**HOW TO REPLACE FOR PROFIT** If you follow these three guides you can't go wrong in replacing worn-out, undersized or obsolete equipment for better profits. 1. Make sure you know what capacity you are planning for . . . and then allow for reasonable expansion without excessive cost in the bigger years ahead. 2. Take advantage of reliable manufacturers experience and know-how in selecting the right equipment for long term service. 3. Be sure your new equipment is backed by fast factory service in case anything does go wrong . . . or if parts should be needed.

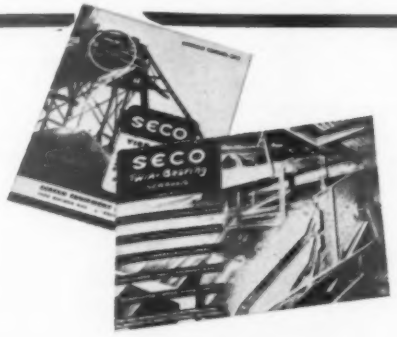
# every production hour . . .

## OR AROUND THE CLOCK!

Yes, it's a wise operator who heeds the advice to the left, who takes stock of his plant, makes sure he is set with a synchronized, up-to-date plant ready to take advantage of the predicted big volume 60's. And he knows that his vibrating screens are the "heart" of his operations and that his plant's potential is directly linked to their ability to "stand the gaff" during round-the-clock or peak production. And a rapidly increasing number of operators around the country know they're "SAFE with SECO" for these 4 big reasons:

1. SECO will make the *right* screen recommendations for size, wire cloth openings and mounting the *first* time. No Monday morning quarterbacks here.
2. SECO furnishes instruction manuals that are clear and concise and make maintenance a simple matter.
3. More than a quarter century of "know how" devoted to vibrating screens exclusively. And this "know how" is based on actual field experience, not armchair theorizing.
4. SECO service can't be beat. Remember . . . SECO is in your corner and wants to do everything within reason to insure your success. Example: SECO ships standard parts the same day ordered.

If you've got a problem and need the right screen recommendation *first*, pick up the phone and call us . . . we'll be glad to help you solve it.




**SECO**

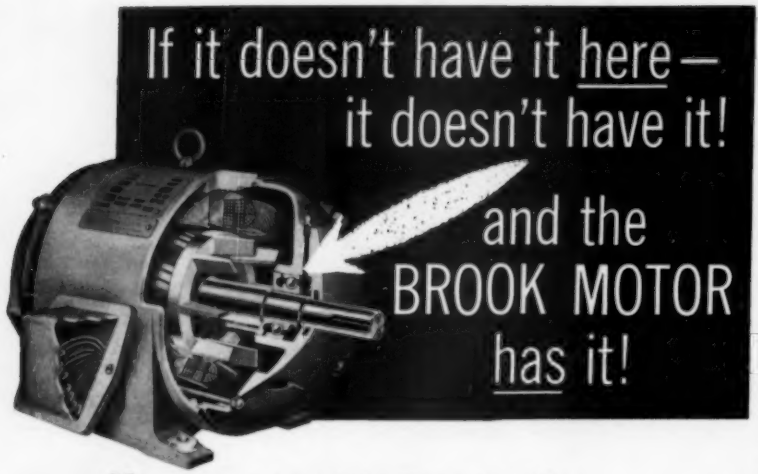
**"TIME CONSCIOUS" VIBRATING SCREENS**

***Send for these helpful screening guides***

4-BEARING CATALOG #204 AND TWIN BEARING BOOKLET TB-21

**SCREEN EQUIPMENT CO., INC.**

**Buffalo 25, N. Y.**




MANY MOTORS look practically alike on the outside, but it's what is inside that counts. There is no motor with better windings or more ample bearings—few motors compare favorably. Yet, the Brook Motor costs less, because of volume production, modern techniques, distribution in 76 countries and a realistic pricing policy. Brook Motors have established excellent performance records for over 56 years in every industry using a.c. motors. From 1 to 600 H.P. Send for literature.

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**STEP UP PRODUCTION . . . PROLONG EFFECTIVE SCREEN LIFE**
**with *Hanco* ELECTRIC SCREEN HEATERS**

- QUICK, EASY INSTALLATION
- TROUBLE-FREE OPERATION
- DUST PROOF
- LOW MAINTENANCE COSTS
- ADAPTABLE TO ALL SCREENS

**START achieving maximum screening efficiency and continuous high tonnage production by installing proven HANCO SCREEN HEATERS which**

**STOP screen cloth blinding, costly shutdowns, screen damage and too-frequent replacement due to abusive mechanical screen-cleaning methods.**

**HANCO ENGINEERS will promptly analyze your requirements and make recommendations for more profitable screening of your products.**

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**1605 Waynesburg Rd. SE., Canton 7, Ohio**
*CABLE ADDRESS: HANCO*

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## INDUSTRY NEWS

*(Continued from page 41)*

porcelain lining, instead of steel. Completion is scheduled for spring of 1961.

Universal Atlas, proceeding with modernization and expansion of its Waco, Texas, plant, includes a new kiln that will raise capacity of the plant to more than 2 million bbl. A special feature of the modernization program, that will be completed late next year, is installation of a glass-bag filter system.

Bessemer Limestone & Cement Co. plans a six-year, $10 to $12-million improvement program that includes a new cement plant with larger and more efficient equipment. Present capacity of the company's 40-year-old operation is 3 million bbl.

California Portland began large-scale modernization of its Colton cement plant that "will make it comparable to any new cement plant from the standpoint of operating efficiency, product quality and dust control." Almost every department, said the company, will be replaced or completely modernized. Engineering work has begun and orders for heavy machinery are being placed. The program is estimated for completion by the end of 1962.

Two new kilns, with combined capacity of 4 million bbl. of clinker per year, will be added, as well as a new raw grinding department and a new finish grinding department for regular portland cements. There also will be new storage silos, bulk loading facilities for rail and truck shipments and technical instruments and apparatus for automation.

Arizona Portland Cement will expand its Rillito plant to provide improved storage and loading operations. Additions include storage silos, a new finish mill and grinding machinery, loading facilities for truck and rail transportation and lengthening of the spur track from the Southern Pacific to reach the new loading docks.

Penn-Dixie will complete expansion of its Clinchfield, Ga., plant early next year. Annual capacity of the plant will be increased by 1.15 million bbl. to a total of 2.372 million. Involved in the expansion program are installation of a new 11½ x 450-ft. kiln and related grinding and auxiliary equipment, plus facilities to store an additional 150,000 bbl. of cement.

Lehigh will spend about $20 million on modernization and expansion this year, says its vice president, William J. Young. The company aims to have truck loading facilities at all plants by

*(Continued on page 50)*



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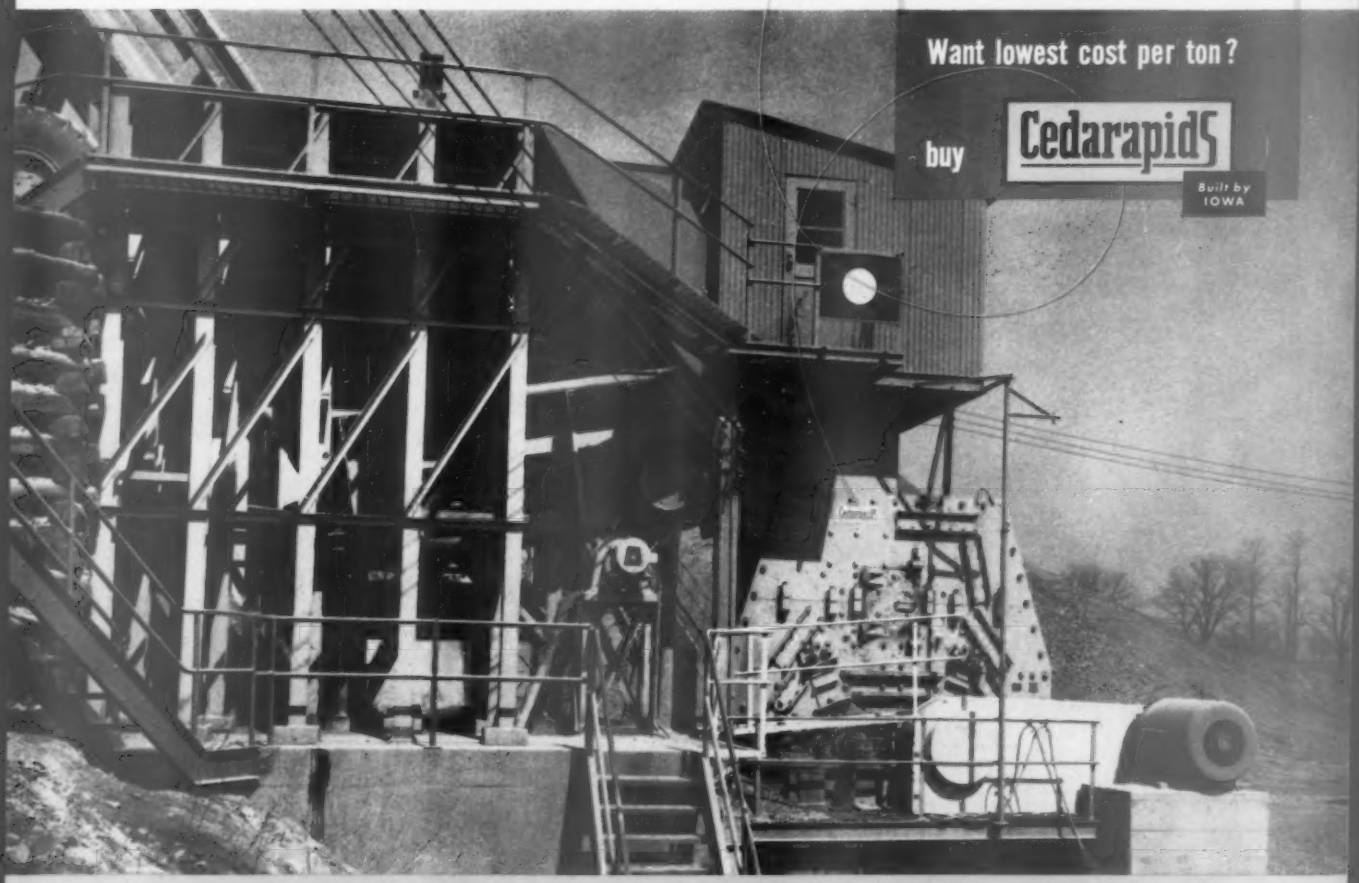
# Here's why more cement producers prefer
# CEDARAPIDS DOUBLE IMPELLER IMPACT BREAKERS

Up to 1000 tons per hour capacity! Six model sizes to choose from. High 40 or 50 to 1 reduction ratio cuts production costs, reduces need for auxiliary secondary crushers, screens, conveyors, etc. Low maintenance and operating costs; rock enters the unit from the highest point to utilize the entire breaking chamber for breaking rock against rock. With 50% less contact of stone against metal, wear on hammers and breaker bars is reduced and horsepower requirements are cut. These are a few of the many benefit-features of Cedarapids Double Impeller Impact Breakers which help cement producers step up output and cut costs for crushing limestone and shale. See your Cedarapids Dealer for complete details.

**This cement company produces 300 tph, with 80-90% of material being crushed**

Crushing high calcite limestone, a prominent Eastern cement producer operated its 4350 Double Impeller Impact Breaker on 8 hour per day shifts. With 80% to 90% of material requiring crushing, the peak production for one shift was 2400 tons! Taking rock up to 43" in diameter, the Cedarapids Breaker reduced it to 3" product in one pass.

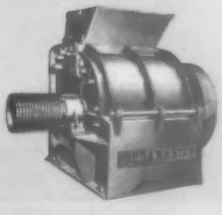



**Cedarapids serves the cement industry with a complete line of equipment**

**ROLL CRUSHERS,** in 6 sizes with 3 types of roll shells, insure high capacities of the smaller sized finished product you want.

**HORIZONTAL VIBRATING SCREENS** provide as much as 12½% greater screening area than inclined screens of the same size. Available in 3' x 8' to 60" x 16' sizes, with double or triple decks.

**HAMMERMILLS** produce a much finer quality of product, and size for size, produce more tons per hour than other similar types of equipment.



**IOWA MANUFACTURING COMPANY • Cedar Rapids, Iowa**

# "Our ten Ford Tandems are nearly a year old and not one has been off the job for repairs"

**SAYS ALBERT HOEFFKEN, PRESIDENT**
**HOEFFKEN BROS., INC., BELLEVILLE, ILLINOIS**

"We have been in the grading and paving business since the turn of the century and have used Ford Trucks since the Model T days. Our experience has proved that Fords are economical to operate and the easiest to keep on the job. All repairing is done in our shop so we can tell which trucks are the best for us.

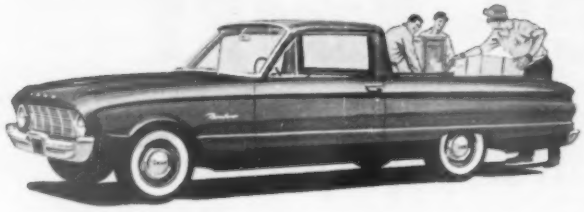
"Our schedules make it impractical to assign a driver to a particular truck and it's not unusual for one unit to have as many as 20 different drivers. This is one of the big reasons we ordered Transmatic Drives on our most recent Ford Tandems. These ten T-800's are nearly a year old and not one has been off the job for repairs.

"Ford's '332' V-8 gives us the power and performance we need for efficient batch concrete hauling. Our Tandems with Dumpcrete bodies carry nearly 6 cu. yd. per trip. And, even in mud up to the axles, they get the loads through. Another thing we like about Ford Trucks is the fact that Ford parts are less costly to buy and much easier to obtain than parts of other well-known truck manufacturers."

## Now at your Ford Dealer's

# FORD Falcon RANCHERO

**America's lowest-priced* pickup truck!**



The Falcon Ranchero is priced lower than any pickup in America with comparable standard equipment! And that is just the beginning of your savings. Single-unit construction saves on maintenance . . . it's tighter, quieter, with main underbody structural members zinc-coated against rust and corrosion. Front fenders bolt on, cost less to replace. And Ranchero's passenger-car ride and handling ease lessen driver fatigue.

**UP TO 30 MPG!**

*Totally* new for *total* savings! Ford's new Falcon Ranchero delivers up to 30 miles on a gallon, yet its new 90-hp Six is geared to do a real job! There's lower costs for oil, tires, brakes, replacement parts . . . nearly everything!

**BIG 6-FOOT BOX!**

Capacity is more than ample for most pickup hauls—nearly 8 feet of load length with tailgate flat. And thanks to the low floor height, loading and unloading is faster, easier!

**FEATURES:**

1. Up to 30 miles on a single gallon
2. 4,000 miles between oil changes
3. Diamond Lustre Finish needs no waxing
4. Low loading height
5. Instant-lock tailgate opens, closes with a single, one-hand motion
6. Roomy comfort for three adults
7. Styled to capture admiration

*Based on a comparison of latest available manufacturers' suggested retail delivered prices with comparable standard equipment

**See the parade of pickups during your FORD DEALER'S TRADING FAIR**

**Hoeffken's T-800 Fords,** with Dumpcrete bodies, are real all-purpose trucks. They can carry up to 14 tons of crushed rock or 5.7 cubic yards of batch concrete.

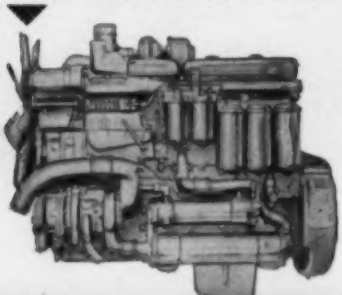
*Enter 1075 on Reader Card*

# Power-steer and power-shift

## with TD-25 standard equipment ...for full-load turns ...full-speed cycles!

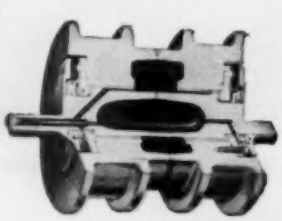
**Keep big rock loads** on the move *full time*, with exclusive Planet Power-steering. Full power on both tracks, full time is the answer! And Hi-Lo, on-the-go power-shifting lets you match power to condition, instantly, and keep the yard-boosting advantage of uninterrupted momentum!

**Big power "plus"** of the new TD-25 is the new direct-start, turbocharged 6-cylinder International DT-817 diesel engine. This versatile engine also powers International Payscraper®, Paywagon®, and rear-dump Payhauler® models — plus the TD-25. Equipment-spread power standardization simplifies your servicing and parts-stocking.



**Cleaning the face** of a Missouri strip mine behind a big dragline, this TD-25 shoves "tractor-sized" boulders aside with the greatest of ease. The "25" also builds dragline walkways and haul roads; pushes loaded trucks; and drastically cuts the cost of clearing new stripping areas.

**Thickest-shelled roller design** in the crawler industry—with king-size lube reservoirs and seal-protecting pressure-relief passages—let you power-lubricate without affecting seal life or efficiency. These are Dura-Rollers—the track rollers that make 1,000-hr lube intervals practical!



## No attachment! No after-thought! No stop-gap!

Years'-proven Planet Power-steering and Hi-Lo power-shifting are *designed-in, built-in,* basic standard equipment of the new 230-hp International TD-25.

With "live-track" Planet Power steering, you get full-load king-size crawler efficiency on turns, as well as straight-aways. And Hi-Lo power-shifting gives you on-the-go matching of power to load to give you big, cycle-speeding advantages!

International Planet Power-steering eliminates load-limiting "dead-track" drag. And Hi-Lo power-shifting does away with time-wasting "gear-shift lag." No wonder the new TD-25 can outearn king-sized clutch-steered crawlers up to 50%—on tough high-walling; overburden removal; and many other coal, mineral, or building-material mining jobs!

### Big-capacity track-and-engine teamwork

New TD-25 7-roller tracks are strength-matched to team with the full effort of the New 230 hp diesel engine. The "25" is platformed on super-rugged double-box-beam frames—and carried smoothly on International's new minimum-maintenance Dura-Rollers!

Press the direct-start button, to command the "25's" free-breathing diesel horsepower. Dual valving of the "25's" high-torque DT-817 engine provides for peak turbocharging efficiency—to deliver full-rated performance from sea level to timberline!

Full TD-25 performance is at your fingertips, full time!

**Power-shift and power-steer** the new "25" with king-sized loads—around curves, upgrade, anywhere. Compare years-proven simplified International planetary design that's engineered and located to break the load-limiting, time-losing steering and shifting bottlenecks which plague king-sized clutch-steered crawlers. Measure all the "25's" standard equipment extra value features. Let your International Construction Equipment Distributor demonstrate!

**International® Construction Equipment**

**International Harvester Co., 180 N. Michigan Ave.**

**A COMPLETE POWER PACKAGE:** Crawler and Wheel Tractors . . . Self-Propelled Scrapers and Bottom-Dump Wagons . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carburetor Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

WHY 1 MAN + 1 SCHRAMM T-64 ROTADRILL CAN DRILL BLAST HOLES UP TO 10 TIMES FASTER

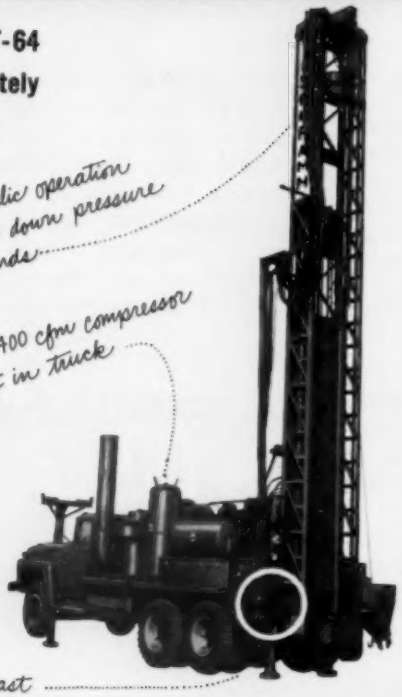
**1 Schramm Model T-64 Rotadrill is a completely self-contained drill rig**

full hydraulic operation
maximum down pressure
28,000 pounds

Schramm 400 cfm compressor built right in truck

sets up in 5 minutes for work

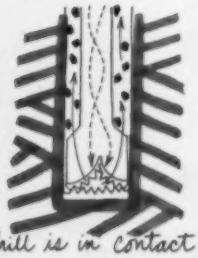
all drilling controls located by mast



**2 Rotadrill lets you speed work with compressed air**

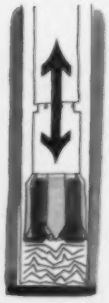
WITH TRI-CONE BIT

powerful air blast constantly blows out chips, water, blockages



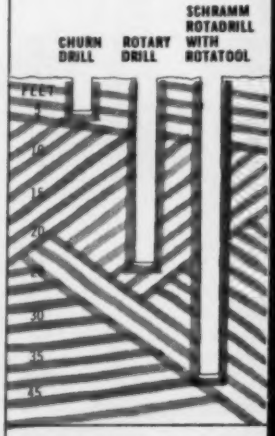
drill is in contact with solid rock 100% of the time

WITH SCHRAMM ROTATOOL



works like air hammer — pounds rock 600 blows a minute as air keeps hole clean

**3 compare hard rock drilling rates per hour**




Get the full story of how the Schramm Model T-64 Rotadrill can cut your tonnage costs. Write for Catalog TRD-59 and the name of your nearest dealer.

Schramm

ROTADRILLS and ROTATOOLS

645 North Garfield Ave., West Chester, Pa.

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(Continued from page 44)

the end of 1960, Mr. Young told The Wall Street Journal.

General Portland Cement will spend an estimated $11 million in 1960 for improvements and expansions, said Smith W. Storey, chairman of the board. The company's Tampa, Fla., plant will be enlarged to turn out an additional 3 million bbl. per year, and other plants of the company have scheduled improvements.

Marquette reported to stockholders that it would spend $9.5 million in 1960 for cost-saving improvements. The program is in line with the company's observation that "modernization rather than expansion is the sound route to improved earnings in the cement industry at present."

## Big Horn Gypsum Co. to build plant at Cody, Wyo.

A NEW $3-MILLION GYPSUM PLANT will be built on the Burlington Railroad at Cody, Wyo., by Big Horn Gypsum Co. Ground was broken in March for the plant which will process about 100 million ft. of gypsum board annually. Raw material will be taken from a deposit 4½ miles south of Cody. Sid H. Eliason, president, said the plant would employ about 125 men. Johnson and Johnson, Chicago, Ill., are the architects and engineers who are planning the construction.

Officers of Big Horn Gypsum are, in addition to Mr. Eliason: Edward L. Hildebrand, executive vice president, and Sid H. Eliason, Jr., secretary and treasurer. Executive officers are at 818 Kearns Building, Salt Lake City, Utah.

## Southern Pacific Milling in transfer of ownership

SOUTHERN PACIFIC MILLING CO., El Rio, Calif., has become a subsidiary of United Industrial Corp., Los Angeles. In a letter to stockholders, B. F. Gira, president of United, said that $4,450,000 was paid for substantially all of the capital stock of Southern Pacific Milling.

Mr. Gira also said that a long-range expansion program will be undertaken by Southern Pacific Milling, and that details would be announced by its president, Philip E. Holmes.

(Continued on page 52)



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**Raise the clam and you have a full-size, full-capacity dozer for stripping overburden or pushing gravel down the bank, tons at a time. 'Dozer rides on exclusive "skid shoes," to keep cut accurate, and prevent uneven blading.**

# Doubles for DOZER, SHOVEL, SCRAPER, CLAMSHELL... *even dynamite!*

## Clam-action 4-in-1 offers you money-making possibilities, unlimited

**Open the clam of an International Drott 4-in-1** and a whole new range of equipment versatility opens for you. Each big-capacity 4-in-1 action "doubles" for one or more specialized earthmovers!

**Skid-Shovel action** takes over for the power shovel —and with tremendous triple-power, pry-over-shoe break-out action often doubles for dynamite in grubbing stubborn stumps, buried boulders, or hard clay, gumbo, and rock. *"Carry-type scraper"* action works like a scraper or dragline on jobs like stripping overburden...also gives you grader-like precision on haul road maintenance. *Clamshell action* lets you "back-drag"; grab and load solid objects like stumps; "surround" loose materials without chasing them! *Bulldozer action* gives you versatile blading, depth-regulated by radius control!

**You adjust and control** each 4-in-1 action, seconds-fast, hydraulically from the tractor seat. Each action gives you a wide range of job-handling working positions. And only the 4-in-1 has the positive performance protection of shock-swallowing Hydro-Spring!

Just move the machine selector lever to put a whole spread of equipment actions at your fingertips!

**Prove first hand** that a versatile 4-in-1 can give you money-making ability, unlimited! Let your International Drott distributor demonstrate!

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

INTERNATIONAL® DROTT®

**Instead of burrowing into the bank** and risking slide dangers, use clam to back-drag loose material within safe reach. Then load either with clamshell or regular 4-in-1 bucket action.

**Get higher reach** than roll-forward type buckets by bottom-dumping! Opening the clam pulls sticky material from bucket surfaces—gravity pull does the rest!

NO SPOT FOR A BREAKDOWN!

KEEP IT GOING AT ITS BEST ...USE ONLY GENUINE HAYWARD REPAIR PARTS!

Hayward Buckets are designed with the most efficient construction features known. And only with *genuine* Hayward replacement parts can you be sure of maintaining that same high quality. Cheaper "bootleg" parts reduce efficiency, raise operating costs and disrupt schedules.

Anticipate any possible breakdown.
Write today for list of genuine Hayward parts.

THE HAYWARD COMPANY
50 CHURCH STREET, DEP'T R, NEW YORK 7, N. Y.
*Builders of Better Buckets Since 1888*

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Maintenance Tip No. 1

GRIPPER EDGES ON VIBRATING SCREEN SECTIONS

Is the gripper or flange design right for your vibrating equipment? Are the flanges held parallel? Is the radius of the flange hook correct? Does the cloth lie flat? Are the ledges clean? Is the tension drawn on the screen section squarely? Check these points carefully to correct gripper edge problems. Call Cleveland Wire Cloth for valuable assistance and top quality vibrating screen section cloth.

Write for FREE maintenance-reducing check sheet today.

THE CLEVELAND WIRE CLOTH & MFG. CO.
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*(Continued from page 50)*

## Johns-Manville promotes asbestos-asphalt paving

JOHNS-MANVILLE CORP., New York, N.Y., has developed a new use for asbestos fibers—as an ingredient in asphalt road paving mixtures. At the company's annual meeting, the research was announced by C. B. Burnett, president, and described by C. F. Rassweiler, vice president for research. By adding two or three percent of asbestos fiber to paving, the life, performance and maintenance characteristics of the surface are improved.

Mr. Rassweiler said that 18 test strips of asbestos-asphalt paving have been laid in eight states and the province of Quebec, Can., in cooperation with federal and local highway officials. The significance of the research development lies in the fact that the fibers used in paving are the short ones now in oversupply in world markets. If the use becomes widespread, a market for 500,000 tons of fiber a year may develop, he predicted.

Another announcement of importance made at the J-M meeting was of the retirement of A. R. Fisher, chairman of the board. C. B. Burnett, president, now becomes chief executive officer, and the position of chairman is vacant.

## Pavement yardage

AWARDS OF CONCRETE PAVEMENT have been classified by Portland Cement Association for the month of February and the first two months of 1960 as follows:

| | Sq. yd. awarded during: Feb. | 1st 2 mos. |
|---|---|---|
| Roads | 4,369,657 | 9,160,617 |
| Streets and alleys | 1,368,530 | 2,918,283 |
| Airports | 222,921 | 1,292,393 |
| Totals | 5,961,088 | 13,371,293 |

## ASTM Committee Week anticipates annual meeting

AMERICAN SOCIETY FOR TESTING MATERIALS called together 1,400 engineers and scientists for Committee Week, held in Chicago during the month of February. Thirty-five of the society's technical committees cleaned up their year's work in anticipation of the annual meeting June 26-July 1 in Atlantic City, N.J. Among the committees that met were C-7 on Lime, C-11 on Gypsum and D-4 on Road and Paving Materials.

*(Continued on page 54)*



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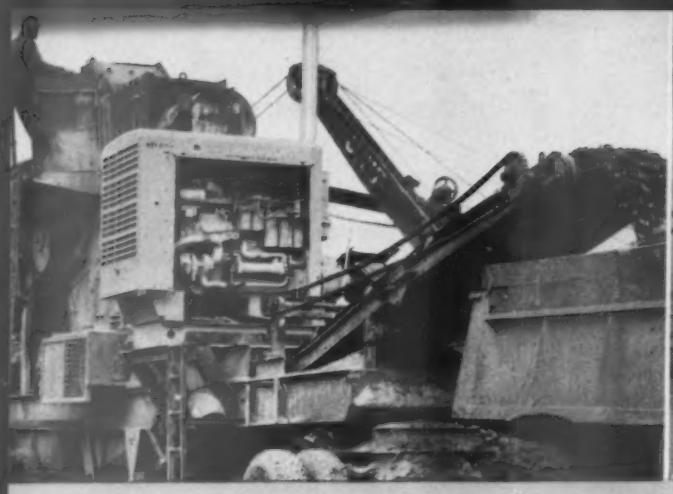
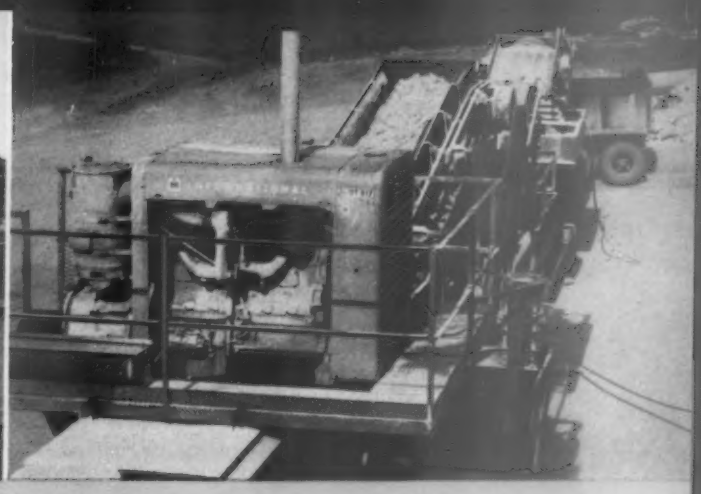


Roy Baker, of Valley Falls, Kans., got 20,000 hours of trouble-free performance from his original IH diesel before replacing it with a new UDT-817. Other reasons for choosing International were easy installation, direct starting and superior sealing. "Fuel consumption on the 817 is low, and with all that power we can eliminate secondary crushing by just reducing the jaw opening," say the Baker Brothers.



Eugene Nelson of Madison Stone Construction Co., in Wisconsin, got this contract off to a fast start with UDT-817 power. "Our profit depended on continuous high production," he reports. "We aimed at 180 tons per hour, but have been able to load out over 200 tons per hour! Specs called for crushing the hard Niagara limestone to minus one inch. We needed more power in a smaller unit and this UDT-817 fills the bill."

# International UDT-817 gives you best power for BIG CRUSHING JOBS—Here's proof...

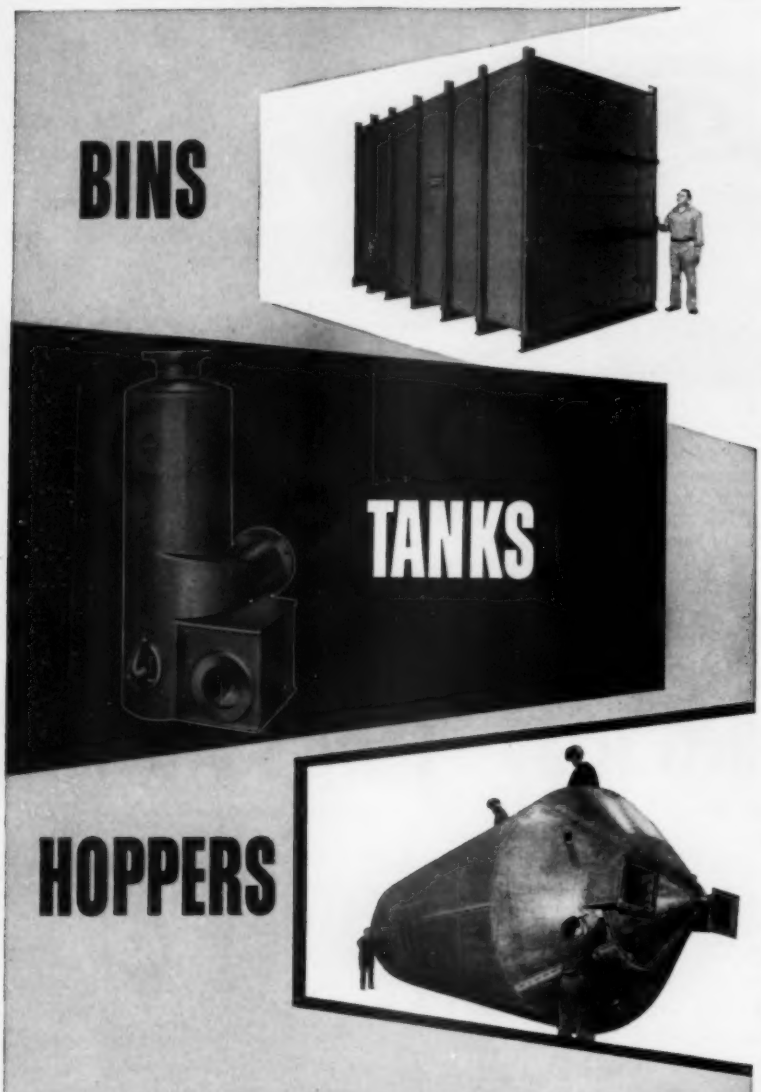
The heaviest crushing jobs are easily handled by this rugged International diesel. Field reports, like those shown here, prove big savings result when your crushing plant is powered by a UDT-817. Here's why...1) The UDT-817 develops 385 max. hp to lead the field in its size class. 2) Specific fuel consumption of the UDT-817 is the lowest in its size class. 3) The UDT-817 is the lowest priced engine in dollars per horsepower in its size class.

While the new 385 hp UDT-817 diesel heads up the International engine line, you can choose from 31 other diesel and carbureted models ranging upward from 16.5 hp. Save on operating and repowering costs by checking with your International Engine Distributor or Dealer, or by specifying dependable International power in new machines. All 32 engines have one common feature: fastest payback power for users.

The West Texas Construction Co. of Lubbock, is crushing caliche at 300 tons per hour with UDT-817 diesel power. The rock is crushed to minus 1¾ inch. Limited by feeder capacity, the big, new International delivers only 265 continuous hp @ 1,800 rpm.—that's power to spare! Other IH power on this job includes a carbureted U-264 engine on the feeder, and a UD-18A diesel on the air compressor.

INTERNATIONAL®
IH ENGINES

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Illinois
A COMPLETE POWER PACKAGE




• for storage or process • lined or unlined

Whether the tanks, bins and hoppers you need are tiny or titanic . . . Kirk & Blum has the "know-how" and the facilities to fabricate them to your exact specifications.

Plant facilities will accommodate sheet, plate and structural to ½" thicknesses. Overhead crane capacity to 25 tons handles the big jobs easily.

Kirk & Blum craftsmen have more than 50 years experience in mild steel, stainless, aluminum and other alloys.

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(Continued from page 52)

## Portland cement production—preliminary survey for 1959

PRODUCTION AND SHIPMENTS of portland cement increased 9 percent each in 1959 over the 1958 figures, according to a preliminary report by the Bureau of Mines. New records were set for the cement industry by production (338,527,000 bbl.) and shipments (335,036,000 bbl.). Although some segments of the cement industry were affected by the prolonged steel strike during the year, most companies reported little loss of market due to the strike.

Five new plants were opened during 1959, one each in Arizona, Mississippi, New Mexico, New York and Texas. Substantial increases in capacity were reported at 22 plants and these, in addition to the new plants, raised the annual production capacity from 402,786,000 bbl. on December 31, 1958, to 413,626,000 bbl. on December 31, 1959.

December 1959 production figures totaled 24,111,000 bbl., a 2-percent increase compared with December 1958. Mill shipments for the month were 20,328,000 bbl., 22 percent over the same month a year ago. Stocks of 31,328,000 bbl. of finished portland cement on hand December 31, 1959, were 2 percent more than those on hand December 31, 1958. There was a 1-percent increase in clinker production for the comparative periods, with December 1959 clinker reported at 27,390,000 bbl. Production figures were provided by 165 plants in 38 states and Puerto Rico.

## Portland cement production

PRODUCTION OF FINISHED PORTLAND CEMENT in January 1960 has been reported by the U. S. Bureau of Mines as totaling 18,669,000 bbl., an increase of .3 of 1 percent over January 1959. Mill shipments for the month were 12,766,000 bbl., a decrease of 11 percent from the corresponding period the year before.

Stocks of finished portland cement on hand January 31, 1960, were 37,088,000 bbl., 6 percent more than those on hand a year ago, and clinker production, totalling 24,079,000 bbl., represented an increase of 3 percent over the January 1959 figure. The statistics were provided by 153 plants in 38 states and Puerto Rico.

(Continued on page 56)



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# HOW Rock-Ribbed Payhauler® GIVES YOU new load-speeding capacity!

**Of all rear-dumps** in their size classes, only the International 65 and 95 Payhauler models give you the weight-shedding, strength-multiplying, rock-ribbed corrugated bodies! You trade 2½ tons of power-wasting dead weight for 3 bonus tons of capacity in the new 95 Payhauler!

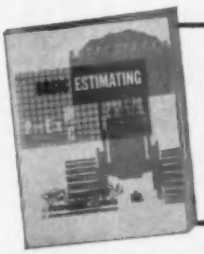
Only the 65 and 95 Payhauler models have the power "plus" of the direct-start, high-torque, 4-cycle 6-cylinder International "817" Diesel engine! The "95" is powered by the 375-hp DT-817 turbocharged Diesel; the "65" has the same basic, high-output power plant: the naturally-aspirated 250-hp D-817!

Choose the "95" with power-shift torque-converter, or 9-speed air-shift transmission. The "65" comes with 10-speed constant-mesh transmission. Both models have the load-speeding safety of reserve-area braking and "one-hand," road-holding power steering! Above, it's the "65" shown storming up a 16% grade with 19-ton payload. Compare how Payhauler gradeability speeds the cycle over other haulers!

**In minimum shovel time** you heap-load the big-target Payhauler body. Rugged corrugations absorb rock-shock—give high resistance to wear and distortion from abrasion and impact! Torque - cushioning planetary-type axles let you apply full power to start and haul full loads!

**Add up the capacity-boosting advantages** of Payhauler power-to-payload *punch*—super-speedy Payhauler loading, hauling and dumping. See how either the 19-ton "65" or 27-ton "95" can give you gear-faster climb-outs—and haul up to 14% faster than other rear-dumps! See your International Construction Equipment Distributor for a demonstration!

**Get 11-second Payhauler dumping** with exclusive, action-speeding inverted hoist design! Simple, easy-to-operate up-and-down snubbing control prevents machine-punishing impact! Fast reverse, up to 7.1 mph., speeds spotting to dump or load!




**Here's your 76-page cost and production estimating book**—newest, most authentic and complete guide for estimating material-moving costs—and for selecting equipment combinations for top profits, anywhere! Yours for the asking from your International Construction Equipment Distributor!

**International® Construction Equipment**

**International Harvester Co.,**
**180 North Michigan Ave., Chicago 1, Illinois**
**A COMPLETE POWER PACKAGE**

Experienced kiln operators insist on
**RINGBLASTER and Western®**

Super-X lead slug shell—8900 ft./lbs. muzzle energy
Shell—New paper tube—slug
Reduced velocity shell—7500 ft./lbs. muzzle energy
Super-X Zinc slug shell—penetrates deeper—for extra hard rings
Ringblaster kiln gun

# THE DEPENDABLE, ECONOMICAL WAY TO SMASH KILN RINGS

Year after year industry's "first-team" for fast, low-cost "ring-smashing" in all kinds of rotary kilns has been Ringblaster and Western Industrial Shells. Constant research in the Winchester ballistics labs has led to many tested improvements. The latest is a scientifically impregnated slug jacket which insures maximum power by sealing extra force behind the slug. This new tightly-rolled paper jacket is now standard on the Super-X and low-velocity lead slug shells. It is designed to eliminate even the slightest fragmentation of the lead slug, and reduces Kiln Gun maintenance problems to the lowest possible level.

With improved Western shells, Ringblaster is an even better choice for accurate ring smashing with a minimum of time, trouble and expense. Requiring fewer shots to do the job, Ringblaster cuts kiln down-time to a new low . . . makes any kiln operation more efficient. Write for details today.

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*(Continued from page 54)*

## Grinding ball life can be measured radioactively

DEPARTMENT OF MINES and Technical Surveys, Ottawa, Ont., Can., has conducted research into the radioactive marking of steel balls for grinding tests. A report of its findings, Technical Bulletin TB 12, is available from the department for 25¢.

Steel balls were labeled with radioactive iron for investigations on life and wear of the balls under operating conditions in grinding circuits. The bulletin, written by G. G. Eichholz, discusses in detail the method of introduction of the tracer and the monitoring procedure.

## IMC improves waste control system at its Bonnie plant

INTERNATIONAL MINERALS & CHEMICAL CORP., Skokie, Ill., spent $1.2 million in 1959 for additional waste control equipment at its Bonnie plant in Florida. By late summer the recirculating system will be completed and in operation. The system is designed to control both gas and liquid wastes in phosphate chemicals processing, according to Floyd B. Bowen, manager of IMC's phosphate minerals and chemical operations.

Not only will the equipment minimize the amount of chemicals released into the air, but it also will improve the recovery of valuable by-products from the wastes. More than 99 percent of the fluorine entering the plant with the phosphate rock will be accounted for in products and other recoveries, Mr. Bowen said.

## Waterfront property is bought by Cutler-Magner

CUTLER-MAGNER CO., Duluth, Minn., has purchased waterfront property comprising 265,000 sq. ft. adjacent to its present salt plant. This will enable the company, who is the northwestern distributor of Huron portland and masonry cements, to do several things: provide dockage for larger lake and ocean-going vessels; expand the production and storage facilities for the salt plant, and greatly improve and expand loading facilities for rail, truck and water shipping.

*(Continued on page 61)*

# Where heavyweights move job records prove...
# FIRESTONE TIRES LOWER OPERATING COSTS!

From project start to finish, Firestone off-the-highway tires help keep equipment moving—help turn downtime losses into on-schedule profits. Firestone SHOCK-FORTIFIED nylon cord protects against punishing impact damage. And in every Firestone off-the-highway tire you get the extra hours of service only Firestone Rubber-X, the longest-wearing rubber ever used in Firestone off-the-highway tires, gives you. With Firestone's Giant Tire Service, a Firestone Tire Expert will match tires to every need on any project. And he'll promptly and expertly handle all your tire maintenance. Get in touch today with your Firestone Dealer or Store, or write to Manager, Off-The-Highway Tires, The Firestone Tire & Rubber Co., Akron, Ohio.

**ALWAYS SPECIFY FIRESTONE TIRES WHEN ORDERING NEW EQUIPMENT**

Super Rock Grip Wide Base* Super Rock Grip Deep Tread*

**TUBELESS OR TUBED**

**Firestone**

***BETTER RUBBER FROM START TO FINISH***

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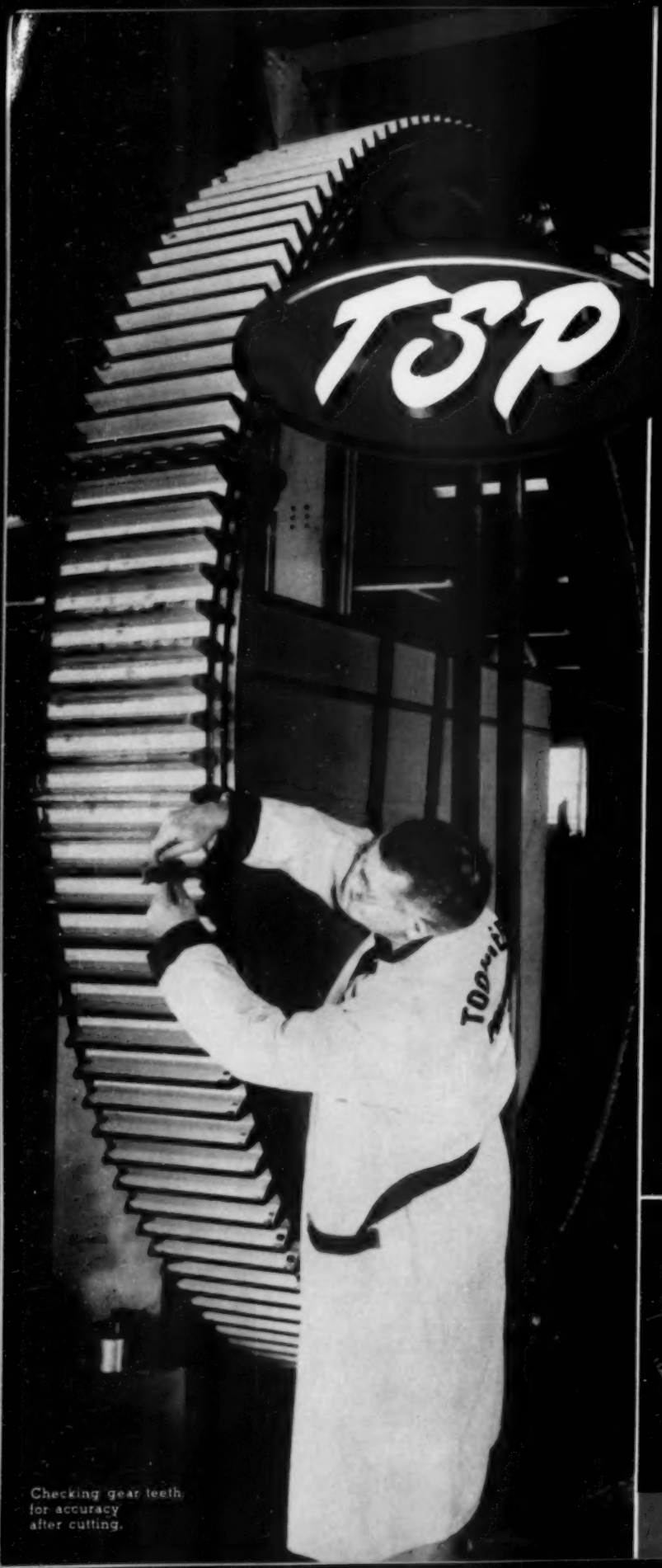


Checking gear teeth for accuracy after cutting.

## products

Continuous expansion of facilities maintain The Tool Steel Gear & Pinion Co. leadership in supplying the cement industry with products and services of superb quality. For example, Tool Steel's Maag gear cutter is the biggest in the world. It can cut gear teeth on gears with a 197" diameter and a 20.8" face. It can cut helical gears up to 190" diameter, 15 degree helical; and 177" diameter and 30 degree helical. High quality precision cutting, combined with a rapid delivery schedule, is a service that cement plants receive when they send their big gears to us for cutting or recutting.

"Tool Steel Process" hardened products are available for practically every key point in cement equipment, including pulverizers, mixers, drag lines, kilns, dryers, shovels, cranes.

Big 11½ foot cement mill bull gear being recut at Tool Steel.

# and service unlimited

TSP Hardened Products are specifically designed, produced and guaranteed to out-perform, out-last any competitive product in the same service. A special hardening process achieves a file hard surface to the full depth of permissible wear. The core is refined for toughness and ductility. If you're interested in keeping your equipment running better and longer, write today for a free copy of our fully illustrated brochure "TSP Products for the Cement Industry."

TOOL STEEL GEAR AND PINION CO.

CINCINNATI 16, OHIO, U.S.A.

The Standard of Quality Since 1909 for Gears • Pinions • Rolls • Wheels and Other Hardened Products

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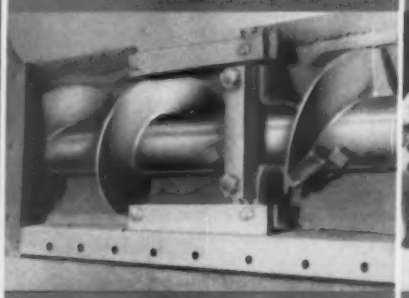
Close-up of TSP wheels on bucket crane after several years service.

TSP trunnions and gearing on rotary dryer.

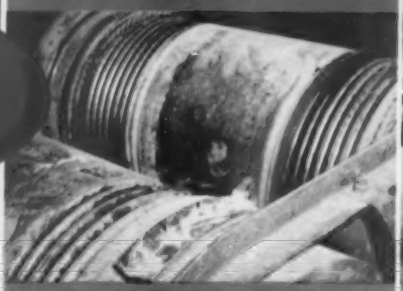
Close-up of TSP trunnions and shaft on kiln. Note smooth appearance after long service.

TSP compartment mill drive pinion. In continuous service since 1928 and still in excellent condition.



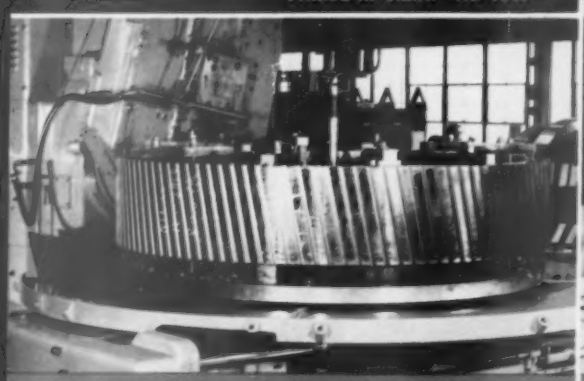
TSP gudgeons on screw conveyors deliver outstanding performance.

TSP main agitator drive pinion and intermediate drive bull gear after several years service.



TSP main holding and closing drums on overhead crane. Note smooth and true grooves on TSP drums.

Rotary cooler showing TSP drive pinions and intermediate drive bull gear after several years service.



Helical gear being cut on Tool Steel's big gear cutter.

TSP Bevel gears and pinions on pulverizing mills.

TSP gearing on dryer.

# NOW...full-time analysis of materials in actual production

XEG X-Ray Emission Gage watches and measures up to 5 selected elements

**Solids, powders, slurries, fluids** — General Electric XEG X-Ray Emission Gage examines them as they actually move through production . . . writes a running record of their elemental make-up. XEG tirelessly surveys up to five elements simultaneously, continuously . . . senses both their *presence* and *quantity*. Where practical to operate minus reference, even analyzes a sixth element.

Versatile XEG serves equally well for on-line process control or individual-sample analysis. Scientifically trained operator is not required — because once set for specific analysis, there's little need for further adjustment. XEG then automatically delivers the facts on composition for rapid-fire, continuous feedback to process control.

Applications are as limitless as your imagination. And, whenever you like, we can explore XEG potentials with you. The details are available now from your G-E x-ray representative. Or write us at General Electric Company, X-Ray Department, Milwaukee 1, Wisconsin, for Pub. RP-54.

*Progress Is Our Most Important Product*

GENERAL ELECTRIC

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*(Continued from page 56)*

## Work goes forward on New Orleans lime plant

WORK BEGAN IN FEBRUARY on the first lime plant to be built in New Orleans—the $1.5 million plant of United States Gypsum Co. It will produce building lime, quicklime and hydrated lime. The 10-acre plant site is adjacent to the company's gypsum manufacturing plant, and fronts on the Inner Harbor Navigational Canal.

Raw material for the lime plant will be clam shells taken from the bottom of Lake Pontchartrain by local concerns and brought to the plant by barge. A 10 x 250-ft. rotary kiln, facilities for unloading, stockpiling and preparing raw material, as well as packaging and storage facilities, are being installed by Southwestern Engineering Co. Completion is expected by September.

## Lime industry accidents show increase over 1958

WITH THE REPORT of nine disabling injuries in December, the total of lost-time accidents for 1959 was brought to 130. The frequency rate of 12.2 and severity rate of 1,521 days were both considerably larger than 1958's 9.7 and 731 days, respectively. There were two fatalities in 1959, against none in 1958.

More cheerful is the report that 23 plants had no disabling injuries, well above the previous record of 17 set in 1956. National Lime Association, in its Limeographs, saluted two safety records: the 10th year completed by the Springfield, Mo. plant of Ash Grove Lime and Portland Cement Co. without a lost-time accident; and the 2,500 days without a lost-time accident achieved by Dow Chemical Co.'s Ludington, Mich., plant.

## Mining engineers name chairmen

THE SOCIETY OF MINING ENGINEERS of the American Institute of Mining, Metallurgical and Petroleum Engineers has appointed new chairmen in its coal, industrial minerals, minerals beneficiation and mining and exploration divisions. Chairmen of divisions, in the order named, are:

H. O. Zimmerman, manager of coal properties, Inland Steel Co., Wheelwright, Ky.; Raymond H. Feierabend, general superintendent, Grande Ecaille Mine, Freeport Sulphur Co., Port Sulphur, La.; H. Rush Spedden, director of research, Metals Research Laboratories, Union Carbide & Carbon Ore Co., Niagara Falls, N.Y., and Robert J. Lacy, chief geophysicist, American Smelting & Refining Co.

## Canadian mineral output registers drops and gains

ALTHOUGH VALUE OF MINERAL PRODUCTION in Canada in 1958 declined 4.1 percent from the preceding year, some materials increased in total valuation. Statistics are contained in the recently issued Catalogue No. 26-201, available for 75¢ each from Dominion Bureau of Statistics, Ottawa, Ont.

Commodities are grouped into four categories—metals, nonmetallics, fuels and structural materials. The first three registered a decline, the fourth an increase. Total production in all categories was valued at $2.1 billion in 1958, compared to $2.19 billion in 1957.

The following data is taken from a table in the report, showing specific materials with respect to quantity and value. In this breakdown, note that cement, lime, sand and gravel and stone are called structural materials.

| | 1957 | | 1958 | |
|---|---|---|---|---|
| Material | Quantity | Value | Quantity | Value |
| Nonmetallics: | | | | |
| Asbestos, tons | 1,046,086 | $104,489,431 | 925,331 | $92,276,748 |
| Barite, tons | 228,048 | 2,992,913 | 195,719 | 2,196,384 |
| Diatomite, tons | 120 | 2,400 | 27 | 540 |
| Feldspar, tons | 20,450 | 393,284 | 20,387 | 359,966 |
| Fluorspar, tons | 66,245 | 1,756,841 | ... | 1,542,589 |
| Gypsum, tons | 4,577,492 | 7,745,105 | 3,964,129 | 5,189,159 |
| Mica, lb. | 1,282,416 | 111,583 | 1,504,933 | 89,651 |
| Structural materials: | | | | |
| Cement, bbl. | 6,049,098 | $ 93,167,477 | 6,153,421 | $96,414,142 |
| Sand and gravel, tons | 159,829,512 | 91,939,354 | 160,210,945 | 96,282,363 |
| Lime, tons | 1,378,617 | 16,678,614 | 1,596,422 | 19,465,823 |
| Stone, tons | 40,282,081 | 59,197,662 | 38,156,647 | 55,582,929 |

*(Continued on page 63)*

Another PLUS value...

It's proved in actual performance...in many applications a single strand of Rex Chabelco Steel Elevator Chain is being used to replace double strands of ordinary chains. Here's why:
• *Largest working bearing areas for long life* • *Accurate size control and fits for maximum fatigue resistance* • *Precision-made chain parts for smooth sprocket action...less wear on chain and sprockets.*

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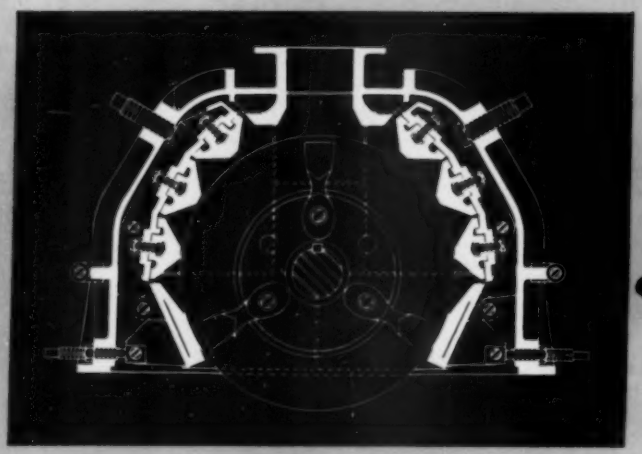

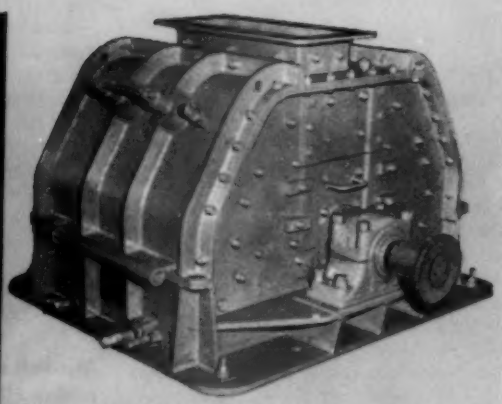

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The Pennsylvania-pioneered reversible impactor is known throughout the industry for its amazing economy. Here's why.

1. "Free air" impact crushing, with elimination of attrition, means lower reduction costs. Material drops through centrally located feed chute, penetrates deep into path of beaters, is struck, shattered, driven against massive anvils, and is again struck by rotating beaters.

2. Low power requirements, because of large working clearances. There are no cage bars or screens in an impactor. Feeds get through quickly. More product per hour.

3. Push-button reversal. Rotor can be reversed and new sets of hammer faces and breaker blocks are provided on the other side of the mill. No time out or manual hammer turning. Identical product in either direction.

4. Adjustable breaker blocks. As wear occurs, simply move blocks toward hammer circle . . . more constant tonnage, uniform product, more tons crushed per set of hammers.

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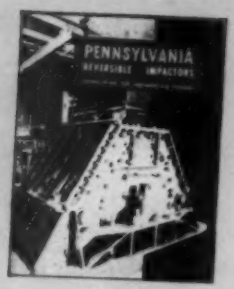


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*(Continued from page 61)*

## Dredge finishes job at Black Lake pit

THE $2.7-MILLION DREDGE, Fleur de Lis, has completed a 51-month project of pumping more than 75 billion gallons of water from Black Lake, Quebec. What used to be a 500-acre lake is now an open-pit asbestos mine, capable of producing 100,000 tons of fiber annually. Having worked its way down more than 560 ft. from the original level of the lake, the dredge now rests on stilts on the lake bottom.

The mine and mill adjoining are operated by Lake Asbestos of Quebec, Ltd., a wholly owned subsidiary of American Smelting and Refining Co.

Besides pumping out the water at the rate of 45,000 gpm., the dredge removed more than 31 million cu. yd. of silt and overburden. Operations went on the year around, with two tugs serving as icebreakers during the harsh Quebec winters.

## Kaiser Gypsum to locate new plant in Jacksonville

KAISER GYPSUM CO. announced plans to build a gypsum products plant in Jacksonville, Fla. Primary engineering is under way for the plant. Because it is adjacent to deep water transportation, the plant will be supplied with self-discharging vessels.

## N. Y. Trap Rock enters lightweight aggregates field

NEW YORK TRAP ROCK CORP., West Nyack, N.Y., signaled its entrance into the lightweight aggregate field by signing options to purchase the business, plant and real estate of the Dennings Point Brick Yard at Beacon, N.Y. The contract is subject to the proving of reserves of shale and clay on the 635-acre property, and will be concluded by late spring.

Plans then will go forward for erection of a large, modern lightweight aggregate plant, as well as the construction of modern laboratory facilities for research and development in this and other fields. New York Trap Rock plans an outlay in excess of $2 million for this construction. Heading up the new activity will be Milton E. Goul, former district engineer for the New York State Department of Public Works.

## Elmhurst-Chicago Stone gets zoning approval

THE ILLINOIS SUPREME COURT ruled in favor of Elmhurst-Chicago Stone Co., Elmhurst, Ill., permitting it to operate within 200 ft. of residential property lines. The high court set aside an earlier decision of the Du Page Circuit Court, which ruled that the company was violating the county zoning ordinance of May 1957. The high court held that since the property had been owned by the firm and used for quarrying before May 1957, the quarrying operation was a legal nonconforming use.

## American Potash allots funds for improvements

AMERICAN POTASH & CHEMICAL CORP., Los Angeles, Calif., will spend $25 million for capital improvements over the next three years, announced Peter Colefax, president. The program includes expansion of plants at Trona, Calif., and Aberdeen, Miss.

## Simplot begins silica sand production at Miclasil plant

J. R. SIMPLOT CO., Pocatello, Idaho, scheduled first production in February at its new Miclasil plant near Bovill, Idaho. Mica, clay and silica are the three products that give the plant its name. Initial facilities are complete for silica sand production.

When completed, the $1.5-million plant will have a capacity of 60,000 tpy. of sand and 70,000 tpy. of clay. Open pit mining will be used, with raw materials piped in slurries to the processing plant. A novel feature is the use of two large clay-bottomed settling tanks, 185 and 100 ft. diam., respectively.

*(Continued on page 65)*

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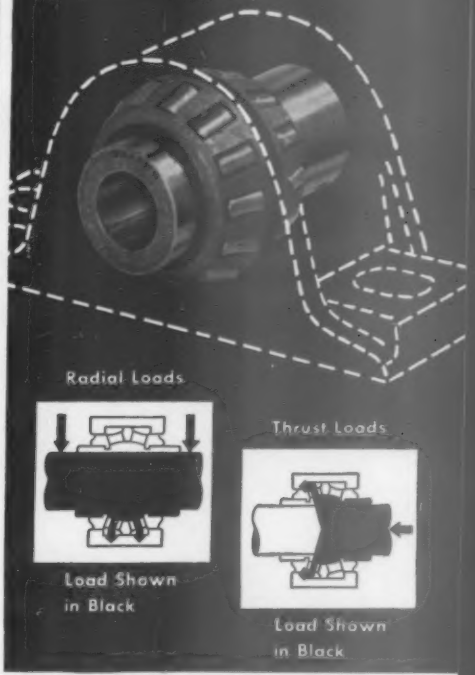


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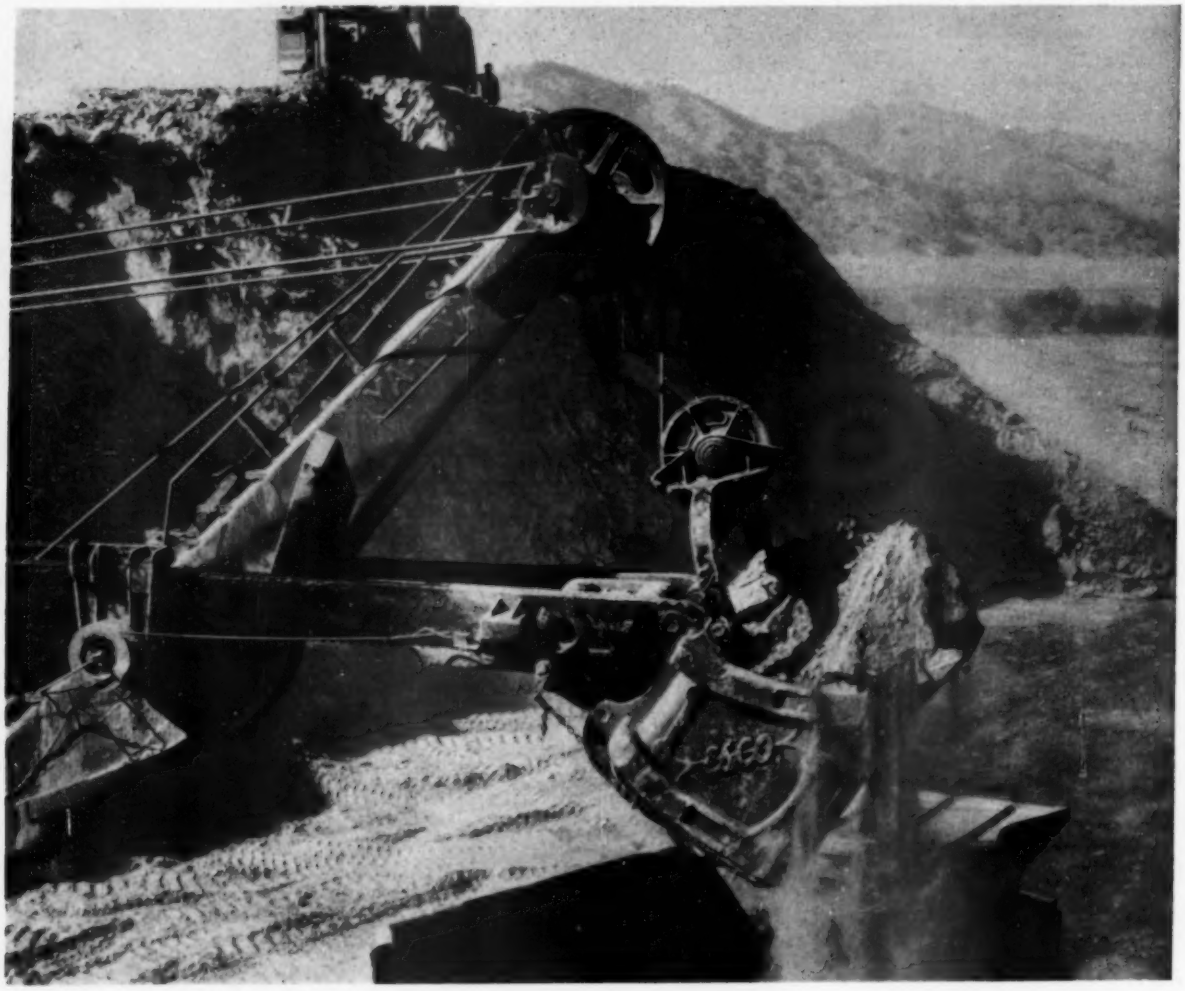

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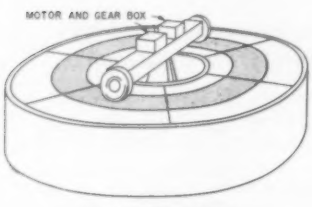
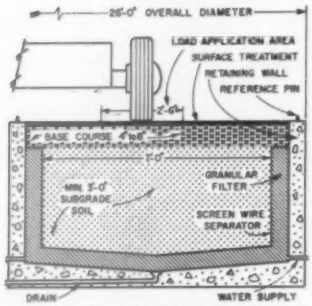
*(Continued from page 63)*




CIRCULAR TEST TRACK




SECTIONAL VIEW OF CIRCULAR TEST TRACK

## Highway tests equal year's wear in week

RESEARCH ON ROAD MATERIALS financed by National Lime Association, Washington, D.C., Pozzolan Products Co. and Marblehead Lime Co., both of Chicago, and G. and W. H. Corson Co. of Philadelphia will be conducted at the University of Illinois. Basic information will be sought to set construction standards for low-cost secondary roads using (1) a slag, lime, fly-ash mix and (2) lime stabilization.

Testing, to take 5 years, will begin not later than September 1, with Professor George W. Hollon of the Civil Engineering department in charge. Professor Hollon has been doing research for four years on the slag, lime, fly-ash mixture, which is now being field tested on several secondary roads in Northern Illinois.

The first three years of work will be devoted to the slag, lime, fly-ash mixture, the next two to lime stabilization. Mountains of fly ash at power plants may become miles of excellent low-cost roads when construction standards are established. Power plants in Illinois alone produce 1.5 million tons of fly ash a year, enough for 210 miles of roads.

Under construction for the tests is a track 26 ft. diam. where the road materials will get nearly a year's wear in a week. Two truck wheels at ends of a beam pivoted in the middle of the track will spin along the 50 ft. of highway at speeds from 3 to 25 mph., with loads varying from 1,700 to 3,000 lb. per wheel.

The test track will be divided into six segments, one consisting of the Illinois State Highway Department's standard crushed stone base construction, others of experimental or test construction. Subsoil will be the same under all. Water content in the subsoil will be varied at will to simulate actual field conditions.

## Consolidated Quarries merges with Georgia Marble

CONSOLIDATED QUARRIES CORP., Decatur, Ga., has merged with Georgia Marble Corp., Tate, Ga. Consolidated Quarries will continue operation of granite crushing plants at Lithonia and Douglasville, Ga., as a division of Georgia Marble, under its president, John W. Dent.

Personnel of Consolidated Quarries continue the direction of operations of the new division. Nelson Severinghaus is vice president of Georgia Marble and manager of its Consolidated Quarries Division. G. A. Austin is a director of the marble company and consultant to the Consolidated Quarries Division.

## Chemstone has profitable year with limestone sales

CHEMSTONE CORP., Cleveland, Ohio, had a profitable year in 1959 despite the steel strike, thanks to its expanded operation. About a year ago the company reported discovery of a vein of commercial-grade limestone beneath its dwindling supply of high-quality stone. This rock was shipped last year to fill highway orders.

Chemstone officials said that 1.2 million tons of stone were quarried up to November 1, an increase of about 45 percent over the 1958 period. There was average employment of 141, an increase of 26 over the payroll of the year earlier.

## Iowa rock deposit purchased as site of quarry operation

SHILDBERG CONSTRUCTION CO., Greenfield, Iowa, has bought 200 acres near Atlantic, Iowa, as the site for a new quarry. The quarry will operate under the name of Midwest Rock Products Co. About $250,000 is being spent to build the plant. The company expects to start production of rock by the middle of this year.

*(Continued on page 66)*

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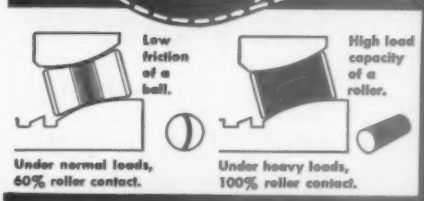
LOAD VARIATIONS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High load capacity of a roller.
Under normal loads, 60% roller contact.
Under heavy loads, 100% roller contact.

Here's why Shafer Bearings add plus stamina and easy go to heavy-duty equipment. Rollers are concave; races are convex. Under normal loads, only 60% of a roller contacts the race—reducing friction to that of a ball. Under shock loads, the tough bearings automatically compress—increasing the bearing area to fit the load requirement.

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# INDUSTRY NEWS

*(Continued from page 65)*

## New road surface employs coal binder for aggregates

CHEMICAL & ENGINEERING NEWS relays information on a new type of road surface that may be tested in Colorado. Developed by Curtiss-Wright's research division, it consists of six to eight percent binder made of bituminous coal dissolved in hot coal tar and tar oil; aggregate—sand and shale chips—is found locally. Twelve miles of test road in Kentucky use river sand and gravel as the aggregate. Curtiss-Wright says it can tailor the material to the type of aggregate found in a particular area. High load capacity is one of the advantages the new material has over asphalt paving, the company affirms.

## New aggregates producer

SKYLINE SUPPLY CO., a new aggregates producer, will construct a $65,000 plant in Murray, Utah. This unusual new industry, an outgrowth of Skyline Chemical and Supply Co., will supply onyx, agate and quartz chips to concrete products producers. It will operate a quartz quarry in Box Elder County, Utah, as well as the new plant at Murray.

## Preliminary work begun on western asbestos mill

JEFFERSON LAKE SULPHUR CO., Houston, Texas, has awarded a contract for preliminary engineering work for its new plant near Copperopolis, Calif. Construction of the $5-million plant will begin soon after the preliminary work is completed. The mill, on the 500-acre site of the asbestos deposit, will be the second complete asbestos mill in the United States. Plans call for its completion by early 1961.

## Form pumicite partnership

WILEY & KNEEDLER MINERAL PRODUCTS CO. has been formed in Ohio, Colo., by Arthur Wiley and Art Kneedler. A pumicite deposit 41 miles from Ohio furnishes the raw material for their operation. They form the ground pumicite into cone-shaped molds and sell them for room deodorizers. There is an estimated 12-million-ton pumicite deposit in the 1,360-acre claim.

**END**

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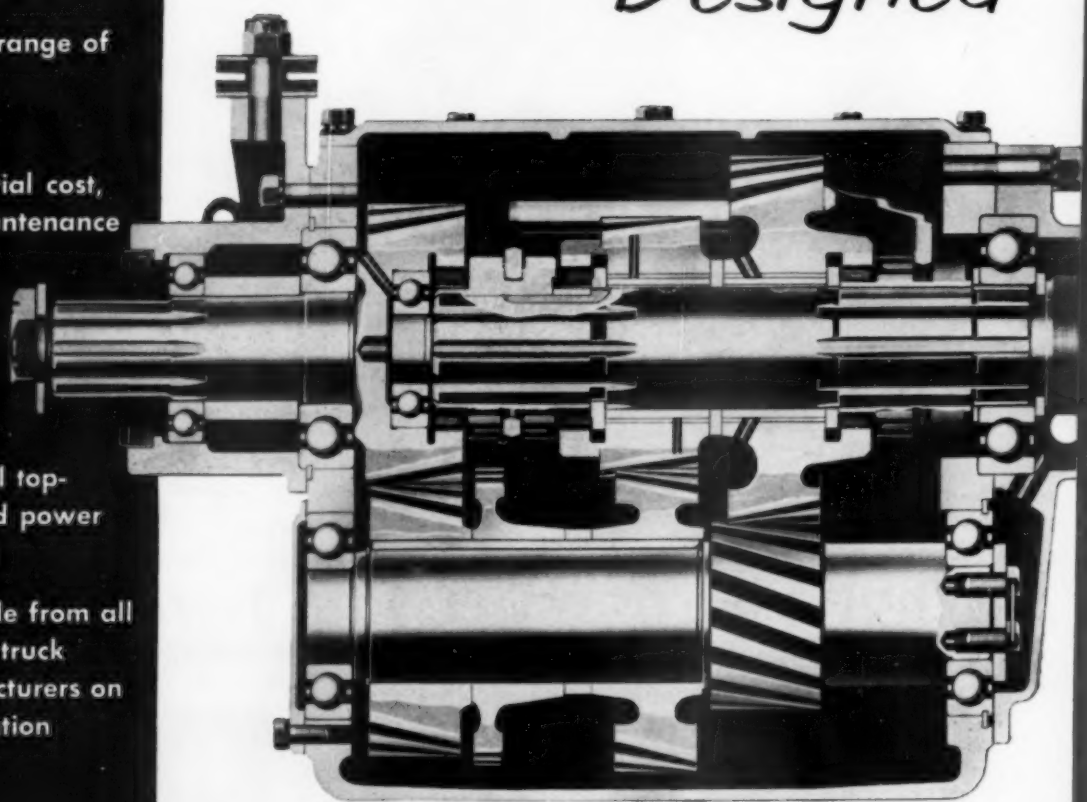

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### 65 Series: Ratios

| MODEL | SPLITTER RATIOS High | SPLITTER RATIOS Intermediate | DEEP REDUCTION Low |
|---|---|---|---|
| 3-A-65 | .754 | 1.00 | 2.221 |
| 3-B-65 | .804 | 1.00 | 1.239 |
| 3-C-65 | .754 | 1.00 | 1.239 |
| 3-D-65 | .804 | 1.00 | 2.221 |
| 3-E-65 | .804 | 1.00 | 1.74 |
| 3-F-65 | .754 | 1.00 | 1.74 |
| 3-G-65 | 1.00 | 1.32 | 2.221 |
| 3-H-65 | 1.00 | 1.32 | 1.74 |

**For HEAVY DUTY, specify the Fuller 92 Series 3-speed Auxiliary**

### 92 Series: Ratios

| MODEL | SPLITTER RATIOS High | SPLITTER RATIOS Intermediate | DEEP REDUCTION Low |
|---|---|---|---|
| 3-A-92 | .74 | 1.00 | 2.09 |
| 3-B-92 | .84 | 1.00 | 1.24 |
| 3-C-92 | .75 | 1.00 | 2.64 |
| 3-D-92 | .75 | 1.00 | 1.24 |
| 3-E-92 | .84 | 1.00 | 2.09 |
| 3-F-92 | .84 | 1.00 | 2.64 |
| 3-G-92 | 1.00 | 1.327 | 2.09 |
| 3-H-92 | 1.00 | 1.327 | 2.64 |

**P.S.** Fuller also offers three heavy-duty 3-speed Auxiliaries with built-in high-torque power take-off. Ask your dealer about the Fuller 3-T-92 Series Auxiliaries.

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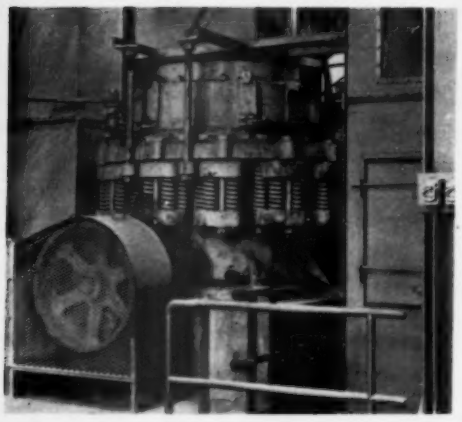
Two 11′ dia. by 360′ Nordberg Rotary Kilns installed in a large midwestern portland cement plant.



Typical Symons 4-ft. Short Head Cone Crusher installed for the economical reduction of cement clinker.

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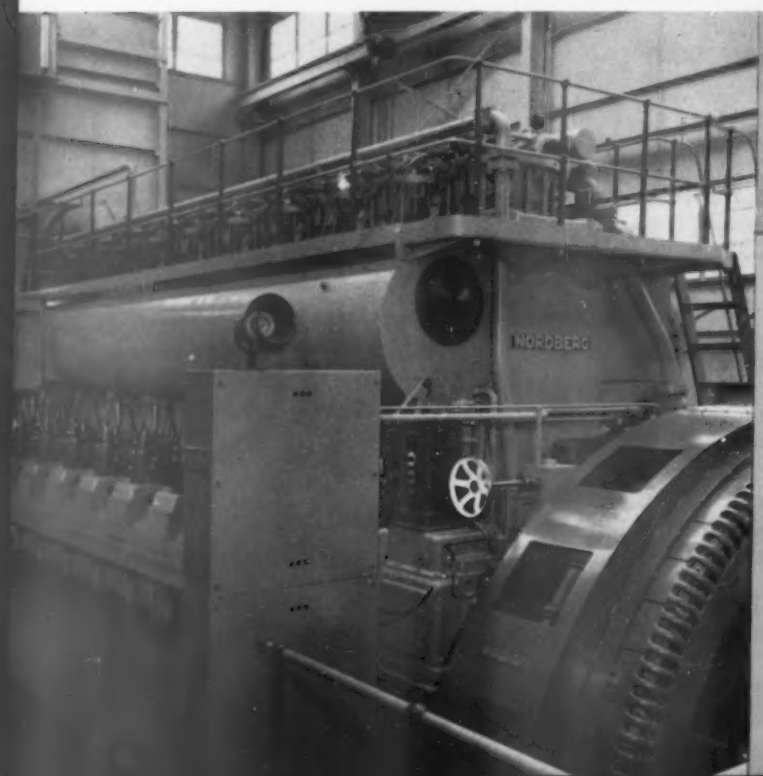
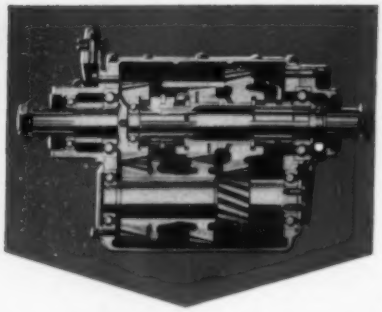



This Nordberg Duafuel® Engine, rated 4425 bhp, 3150 kw, furnishes dependable power for a prominent cement plant in Texas.

Symons Rod Deck Screens like this 5-ft. by 8-ft. unit give many cement plants low per ton screening costs.



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|---|---|---|---|
| MODEL | High | Intermediate | Low |
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| 3-B-92 | .84 | 1.00 | 1.24 |
| 3-C-92 | .75 | 1.00 | 2.64 |
| 3-D-92 | .75 | 1.00 | 1.24 |
| 3-E-92 | .84 | 1.00 | 2.09 |
| 3-F-92 | .84 | 1.00 | 2.64 |
| 3-G-92 | 1.00 | 1.327 | 2.09 |
| 3-H-92 | 1.00 | 1.327 | 2.64 |

*Specify the MODEL*

**FULLER MANUFACTURING COMPANY**
(Transmission Division)
KALAMAZOO, MICHIGAN
Subsidiary EATON Manufacturing Company
*Enter 1057 on Reader Card*

# CALENDAR

## OF COMING EVENTS

### 1960

**May 15-17, 1960**
Empire State Sand, Gravel and Ready Mix Association, 9th Annual Convention, Sheraton Inn, Binghamton, N.Y.

**May 17-19, 1960**
Cement Industry Subcommittee, American Institute of Electrical Engineers, Technical Conference, Pfister Hotel, Milwaukee, Wis.

**May 23-25, 1960**
National Lime Association, 58th Annual Convention, The Cloisters, Sea Island, Georgia

**June 13-14, 1960**
National Limestone Institute Inc., Board of Directors' Mid-Year Meeting, Edgewater Beach Hotel, Chicago

**June 26—July 1, 1960**
ASTM annual meeting and apparatus exhibit, Chalfonte-Haddon Hall, Atlantic City, New Jersey

**July 20-23, 1960**
National Crushed Stone Association, Board of Directors' Mid-Year Meeting, The Greenbrier, White Sulphur Springs, W. Va.

**October 3-5, 1960**
National Sand and Gravel Association, Semi-Annual Meeting, Board of Directors, Del Monte Lodge, Pebble Beach, Calif.

**October 10-13, 1960**
American Mining Congress, 1960 Metal Mining and Industrial Minerals Convention and Exposition, Las Vegas, Nev.

**October 17-21, 1960**
National Safety Council, 48th Annual National Safety Congress, Chicago, Ill.

**November 3-4, 1960**
National Slag Association, Annual Meeting, Hotel Mayflower, Washington, D.C.

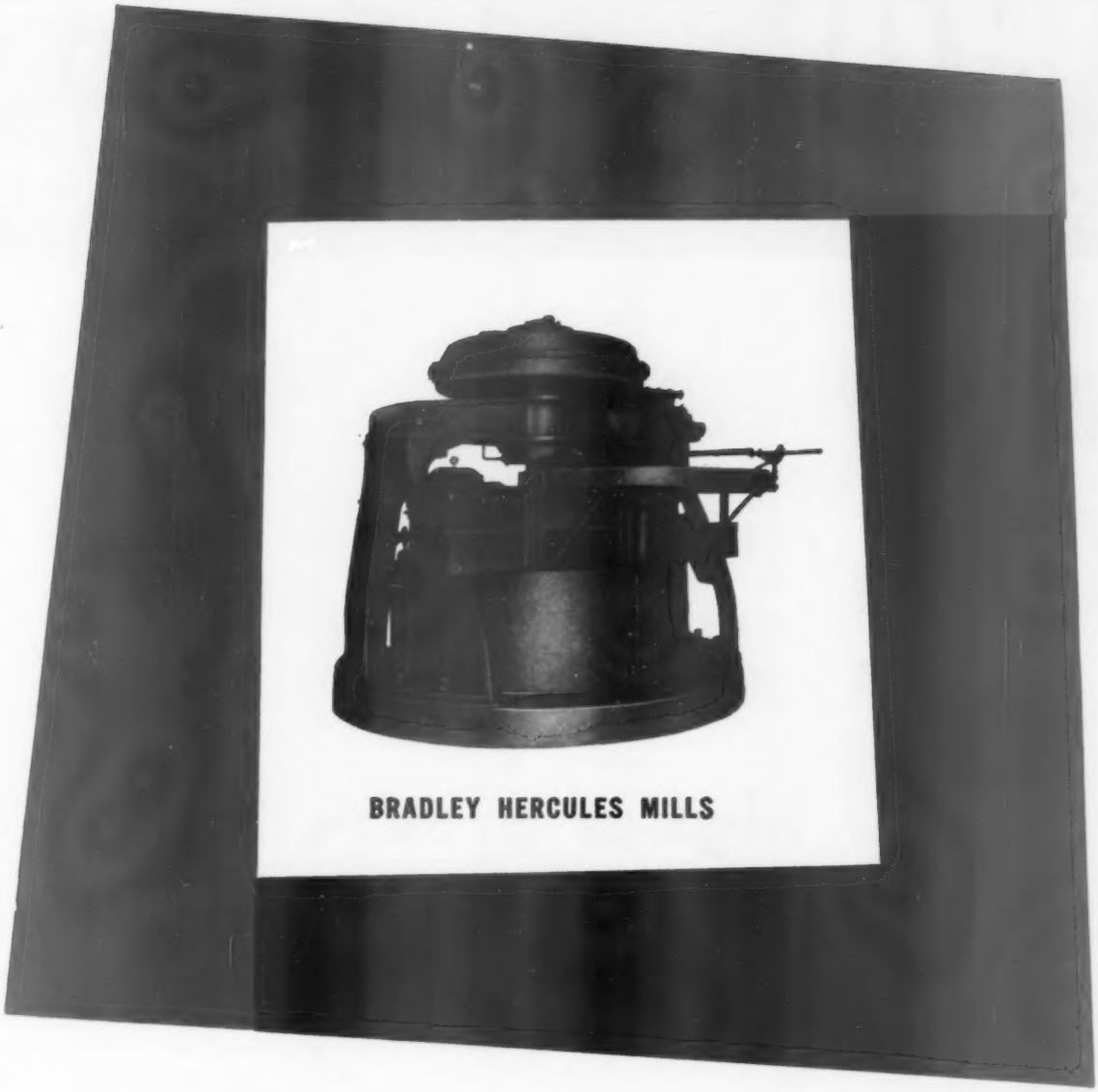
### 1961

**January 17-19, 1961**
National Limestone Institute Inc., 16th Annual Convention, Statler-Hilton Hotel, Washington, D.C.

**January 17-20, 1961**
National Crushed Stone Association, 44th Annual Convention, Hotel Americana, Bal Harbour, Fla.

**January 23-26, 1961**
National Sand and Gravel Association, 45th Annual Convention, Hotel Americana, Bal Harbour, Fla.

**Jan. 29-Feb. 3, 1961**
American Society for Testing Materials, Committee Week, Netherland Hilton Hotel, Cincinnati, Ohio




## HOW TO INCREASE CEMENT PRODUCTION UP TO 50%...

The capacity of an existing tube or compartment mill can be increased up to 50% or even higher simply by installing a Bradley Hercules Mill as a preliminary pulverizer on either the dry raw or finish side. Yet this increased production of cement raw material or finished cement is obtained at no increase in horsepower consumption per ton or barrel produced. The Hercules automatic electrical feed control eliminates manual operation. Rugged construction . . . dustless operation . . . easy accessibility to grinding parts keep maintenance costs at an absolute minimum. That's why so many in the cement industry rely on the Hercules Mill for increased production of finished material.

*See Chemical Engineering Catalog or for complete information, write for Catalog No. 63*

BRADLEY PULVERIZER CO. LONDON ALLENTOWN, PA. BOSTON

*superior grinding equipment since 1891*

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# WHICH IS BEST
## 3 new series Cat Motor Graders

**NEW**
**No. 12**
**Series E**
**115 HP**

**NEW**
**TURBOCHARGED**
**No. 112**
**Series F**
**100 HP**

**NEW**
**No. 112**
**Series E**
**85 HP**

## for higher production, easier servicing and long life!

No machine is better than its engine—and the new Cat Diesel Engines in these three new series Motor Graders are better than ever. They're more compact, more rugged and modern in design. They incorporate the latest developments in metallurgy and technology. They provide three important bonuses—greater lugging ability in tough going, easier servicing and long life.

### A COMPLETE LINE—85 HP to 150 HP

The new Turbocharged 100 HP No. 112F is designed for high production to match work requirements between the new 85 HP No. 112E and new 115 HP No. 12E. Compared with the 85 HP model, the 100 HP machine delivers 5% higher travel speeds and a 5% increase in blade speed control. With its introduction into the line, Caterpillar now offers you a choice of four Motor Graders in all to meet your specific requirements. The largest is the Turbocharged 150 HP No. 14, the most versatile big grader ever developed.

### SEE YOUR CATERPILLAR DEALER

Some of the features of the new Cat Motor Graders are described briefly here. But for the complete picture, see your Caterpillar Dealer. Ask him to show you how they're a better buy for your money than ever. Take a look under the hoods at the new modern-design engines. Better still, ask for a demonstration.

See how they "pull through" tough going.

Caterpillar Tractor Co., General Offices, Peoria, Ill.

**CATERPILLAR**

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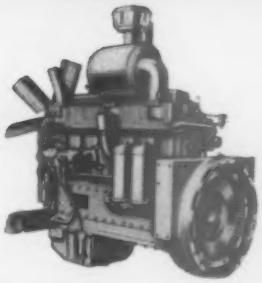
MODERN HEAVY-DUTY MOTOR GRADERS TO FIT ANY JOB

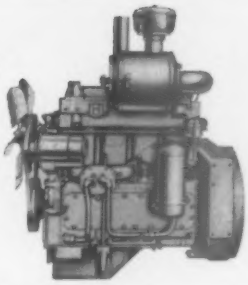
# FOR YOUR JOB?
# with new compact engines!

New No. 12E Motor Grader features new compact 115 HP Engine



New No. 112E Motor Grader features new compact 85 HP Engine

The new No. 112F is similar in appearance, but features a Turbocharged 100 HP Engine.

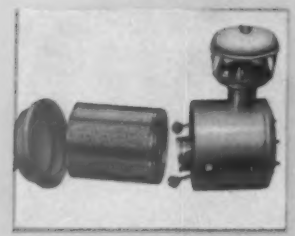


**NEW HIGH TORQUE.** Though the engines in the new Cat Motor Graders are designed specifically for each machine, they all develop higher torque than previous models and have other basic improvements in common. For example: shorter, stiffer blocks and crankshafts... stronger, distortion-resistant cylinder heads... improved cooling systems with greater capacity... engine lubricating oil conditioning... and advanced design fuel systems —new, compact fuel injection pumps with barrel and plunger assemblies in easy-to-service pump housings.

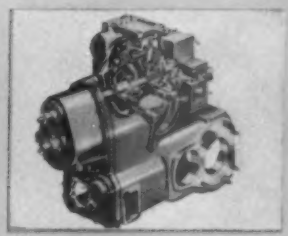
**NEW STARTING ENGINE.** Now standard is a new two-cylinder, vertical starting engine to replace the horizontal engine. All three Motor Graders use a modern 12-volt electric system. An optional 24-volt system is available for use in moderate climates where direct electric starting is practical.

**PERFORMANCE-PROVED FEATURES.** While many advances have been designed into the compact new engines, certain time-tested features have been retained. To mention a few: precombustion chamber design that delivers maximum horsepower on heavy, economy-type fuels... steel-back aluminum bearings... wet-type "Hi-Electro" hardened cylinder liners... and aluminum pistons with cast-in ring band.

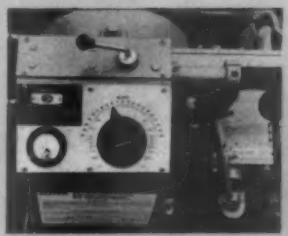
## *OTHER HIGH-PRODUCTION FEATURES IN CAT MOTOR GRADERS*



**NEW DRY-TYPE AIR CLEANER** (standard) removes a minimum of 99.8% of all dirt from intake air during every service hour. Can be serviced in 5 minutes. Cuts your maintenance time by as much as 70% and substantially reduces maintenance costs. Cleaner air also extends engine life.



**EXCLUSIVE OIL CLUTCH** (standard) provides up to 2000 hours service without adjustment, the equivalent of about 12 months of "adjustment-free" operation. A Caterpillar development proved by millions of hours of use, it virtually eliminates down time for clutch repair.



**AUTOMATIC BLADE CONTROL** (optional) cuts grading time in half. Operator sets desired slope on dial and only has to control depth of cut. Manufactured by Preco Incorporated, the unit automatically maintains blade slope within ½" in 10'. Available factory installed.

**IN-SEAT STARTING** (standard) offers operator finger-tip convenience and positive starts in any weather. Another feature: improved mechanical blade controls provide precise adjustment and ease of engagement. "Anti-creep" lock makes blade stay put under load.

# HINTS & HELPS

PROFIT-MAKING IDEAS DEVELOPED BY OPERATING MEN

## Truck cleaner

SOME HINTS & HELPS are so simple that the producer seldom realizes he has done anything ingenious. When we saw this southern crushed rock shovel operator clean out the bottom of a truck in this way, he said, "Doesn't everybody?"

But most producers in that part of the country have a crew of men to clean up the sticky material which has built up in the trucks. But it's a lot simpler to back the truck up to the quarry shovel and let the skilled operator neatly scoop out the accumulated fines.

## Wire rope tip

SEVERAL MANUFACTURERS of cranes, shovels, draglines and other equipment using multiple strands of wire rope suggest that the rope be turned end for end. In this way, stressed sections can be put into inactive places and unused sections can be exposed to more action.

Perhaps the reason that more operators do not spend this relatively little time and effort to conserve the life of an expensive operating tool is the difficulty of working with an awkward, greasy piece of wire rope.

Several producers we know have solved part of this problem. First, they carefully roll up the wire on an old drum or wooden reel as they strip it from the equipment. This permits an inspection as it is put on as well as when it is pulled off the reel. Then they weld a light, flexible strand to the end of the heavy rope. The weld (or braze) is carefully smoothed, and the flexible line is reeved around the sheaves. Then the wire rope, itself, is pulled carefully through the sheaves, making sure that no kinks form.

**Warren Cross, Oak Ridge, Tenn.**

## Safety ladder

THIS SAFETY-MINDED cement producer makes sure that the workers on cement-gondolas don't have to climb ladders on the cars or scramble down makeshift wooden ladders to get to their work.

The new cement plant is equipped with sturdy metal ladders securely fastened to the building. It is a quick and easy job to lower the counter-weighted ladder into position on top of the car; the workmen then go down to their positions in style and safety.

## Crusher cushion

EVEN WHEN YOU KNOW that big crushers are well secured to concrete foundations, they often appear as if they're going to leap into space. Very frequently this pounding will powder the concrete under the crusher and around the bolts. A west coast gravel producer feels that he has overcome this source of difficulty by mounting his heavy equipment on ironwood planks.

Each plank is drilled to let the foundation bolt pass through, and the bolt is extra long for this reason. The primary crusher is mounted on a pair of 4 x 8-in. rough timbers. These seem to cushion the crushing shock of the big jaw crusher when it is reducing 18-in. hard boulders. The timbers apparently distribute the load and shock along the top of the concrete piers and protect them from concentrated impact loads.

## Rubber belts again

DISCARDED STRIPS of conveyor belting seem to have as much use around a rock products producer's plant as the proverbial baling wire. "Lime-O-Graphs" reports that a midwestern lime producer uses sections of belt conveyor to protect his black-top roadways at crawler tractor crossings.

Naturally, the belts must be at least as wide as each tread of the crawler and must have enough carcass left so that the crawlers won't cut clear through the belt. Then, too, each end of each belt must be securely anchored so that the crawler will have traction.

Of course, there are limits to the amount of weight the old belts will support.

*(Continued on page 81)*

BULLETIN
G-11

# Fuller Equipment

***for the non-metallic mining and manufacturing industries***

Automation with a variety of Fuller equipment at Lehigh Portland Cement Company's Union Bridge, Maryland, plant has helped triple plant capacity.

**EQUIPMENT FINDER**

| | |
|---|---|
| Conveyors | 1 |
| Compressors, Pumps, Blowers | 2 |
| Coolers | 3 |
| Preheaters | 4 |
| Control Panels | 5 |
| Material-Level Indicators | 6 |
| Feeders and Valves | 7 |
| Safety Switches | 8 |
| Fans and Exhausters | 9 |
| Airmerge Blending | 10 |

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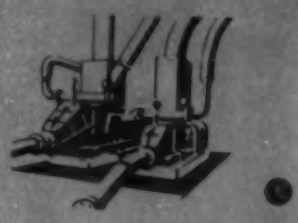
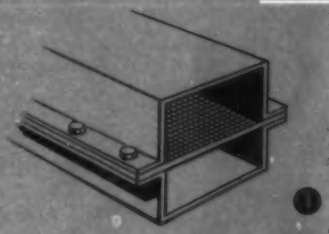
# Fuller Equipment

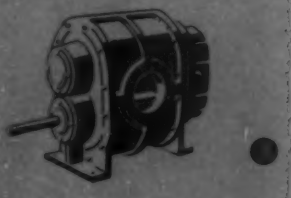


**Fuller-Kinyon Pneumatic Conveying Systems.** These systems offer unique overall plant economy for conveying such materials as bulk Portland cement, pulverized coal, limestone dust, and pulverized phosphate rock. Conveying is done pneumatically, anywhere a pipe line can be run—over long distances, to any number of delivery points, far beyond the practical limits of mechanical conveyors. Used not only for processing, but also for loading and unloading cars, ships and barges, mixing and blending dry-pulverized and granular materials. Installation involves no plant design problems. Systems are easily applied to existing plants, without interrupting production or interfering with structures and equipment. *Bulletin FK-26A.*



**F-H Airslide® Fluidizing Conveyors.** Without the use of moving parts, these revolutionary conveyors transport fine, dry bulk materials, with a minimum of abrasive wear on the conveyor. Porous supporting medium divides conveyor section into two "compartments". Dry material flows down inclined conveyor, fluidized by low-pressure air entering beneath porous medium. The Airslide Conveyor is easily installed, with simple floor or overhead support which releases valuable floor space for other uses. Operation is dustless and noiseless with extremely low power consumption. Conveyor line needs no lubrication, and is self-cleaning, so there is almost no maintenance. *Bulletin FH-2B.*

**Fuller Rotary Compressors and Vacuum Pumps.** Vibration-free, can be installed anywhere, even on balconies. Fewer moving parts mean minimum maintenance. Their unique features include extraordinary capacity with reference to size, weight and floor space requirements; direct drive at common motor and gas engine speeds without reduction gearing; no valves. Maintenance requirements are negligible, and they can operate continuously at full load for long periods without mechanical attention. All parts are readily accessible. Compressors and vacuum pumps handle air and gases from 30 to 3300 cfm at pressures to 125 lb. gage, or vacuums to 29.95 in. (referred to 30-in. barometer). *Bulletin C-5A.*



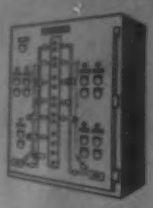
**Sutorbilt Blowers and Gas Pumps.** Accurately designed and built to deliver air or gas in capacities up to 20,000 cfm. Pressures or vacuums up to and including 12 pounds. Standard duty blowers are fitted with four anti-friction bearings, wide face timing gears. Heavy duty units are normally equipped with six anti-friction bearings. All blowers are complete with bases and are recommended for continuous service. Blowers and pumps can be furnished in the vertical design if desired, to facilitate piping arrangements. *Send for Bulletin.*

**Fuller Horizontal and Inclined Grate Coolers.** Compact, easily installed for fast, efficient cooling of such materials as nodulized phosphate rock, pebble lime, ores, dolomite, iron nodules and Portland cement clinker from 2800 F. or higher to any desired point within a reasonable range of atmospheric temperature. They include the latest advances in cooling, for use in many different industries where materials must be cooled after processing. They can also be used for coking. Each type—horizontal or inclined-grate, offers its own advantages. Most important is the fact that Fuller is careful to recommend the type best suited to your needs. *Bulletin CO-7.*

**Fuller Preheaters, Humboldt Suspension Type.** Used for preheating dry, pulverized Portland cement raw materials with rotary kiln waste gases, using a multi-stage suspension process. This draws the gases through a series of cyclone collectors. The material is fed counter to the gas flow. Upon entering the first cyclone stage, the material, continuously delivered and suspended in the gas stream, is successively collected and resuspended until it is discharged through the kiln-feed pipe. Gas and material contact time is thus prolonged, providing a high degree of heat recuperation with a very low temperature differential between gas and material at the final stage. Clinker production with relation to kiln volume is increased. There is lower fuel consumption and the useful life of kilns is extended. *Bulletin FF-3241-2.*

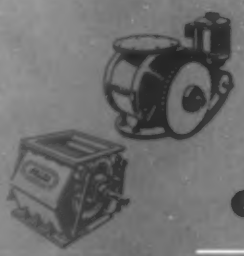
# for every mining and processing need

The completeness of the Fuller line makes it possible to fit your needs exactly. Users will testify to the reputation of Fuller systems for cutting materials handling costs, and savings on installation and maintenance. Let us explain how they can pay off for you. Just write or phone our nearest office.

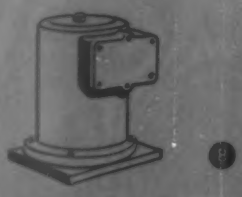


**Fuller Control Panels.** Permit automatic, remote, one-man control of multiple operations. Easily-read panel permits visualizing flow of material to storage or from process bins. Behind them is Fuller's vast materials handling experiences, as well as the instrumentation techniques that make possible true automation in materials handling. Fuller is the only company manufacturing pneumatic conveying equipment to engineer and build its own control panels. This single responsibility for both system and control can mean substantial savings in time and cost. It insures controls inherent to the system, not adapted to it, with no unnecessary components. Coordinated operation of both system and control is assured. *Bulletin E-9.*

**Fuller Material-Level Indicators.** These indicators signal audibly and visibly when materials reach a predetermined high or low level. Mounted on the bin cover, with rotating sensing paddle suspended in the bin, they control conveyor motors, valve circuits, etc. Main working parts are sealed in a dust-tight casing. Available for horizontal mounting, model SG-4X is approved by Underwriters Laboratories, Inc. for use on Class II, Groups E, F, and G—hazardous dust locations. *Bulletin I-5-C.*



**Fuller Vane-type and Roll Feeders . . . and Rotary Valves.** For volumetrically controlled feeding of a wide range of dry pulverized or granular materials. Fuller Rotary Valves are used under silo deck slabs and bins to permit the free flow of pulverized materials which tend to arch, such as lime and cement raw materials. Free movement of the rotor to open and closed positions is assured by careful machining and alignment of the trunnion shafts and dust-tight bearings. Leakage in the closed position is prevented by close tolerances and a double seal. Knife edges and "V" slots at the end of the rotor avoid sticking of packed materials. Built for either manual or motor drive, remotely controlled. These valves can be mounted in the horizontal or vertical position. *Bulletin F-5A.*



**Fuller Motion Safety Switch.** This switch is an automatic safeguard against damage to machines, equipment and processes, resulting from stoppage or reduced speed. It will control a motor circuit, or operate such warning devices as a signal light, horn or bell. It is almost foolproof, and requires little attention. This switch will stop one machine which is serving another if the latter machine should stop accidentally, before further damage occurs. Where the original stoppage is caused by a minor accident, such as a slipping belt or broken chain, the switch limits repairs to correcting what originally caused the stoppage—often nothing more than the tightening of a set screw or removal of foreign material. *Bulletin MS-2.*

**Lehigh Type I. E. Industrial Fans.** Lehigh Type I.E. Industrial Exhausters are of rugged design in mild steel plate construction. The wheels are of the long shaving type. In all welded construction they are precision balanced both statically and dynamically for vibration-free operation. These Exhausters are ideal for handling clean or dust-laden air or gases at temperatures up to 600°F. All units are available in standard or heavy duty construction. *Bulletin L-5.*

**Fuller Airmerge Systems.** The Fuller Airmerge system rapidly blends dry raw materials in large bulk lots by air into a completely homogenized mix. Variations in components as high as 2% are quickly reduced to as low as 0.2%. Capacities—60 tons and upward. Operating Principle: The floor of the silo is divided into four individually-controlled, aerated quadrants. By aerating one quadrant more strongly than the others, the column of material over that section becomes less dense and is displaced by the more dense (less aerated) material over adjoining quadrants. This is repeated with each quadrant in automatic rotation, creating active vertical circulation. Applying air to active quadrants in pulses achieves a high degree of fluidity with a minimum amount of air. *Bulletin B-2.*

FULLER-KINYON and FULLER-FLUXO PUMPS—
For conveying dry pulverized materials.
FULLER-KINYON REMOTE-CONTROL UNLOADERS—
For unloading dry pulverized materials from box cars, ships, barges, and flat-bottom storage bins.
F-H AIRSLIDE® FLUIDIZING CONVEYORS—
For fine, dry materials.
AIRSLIDE® PUMPS
FULLER DUAL FEEDER TRANSFER UNITS
FULLER AIRSLIDE® TRANSFER UNITS

# products of FULLER COMPANY

FULLER AIRVEYOR® PNEUMATIC CONVEYING SYSTEMS—
For unloading, conveying and reclaiming
fine, granular, and crushed materials
FULLER AIRMERGE BLENDING SYSTEMS
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FULLER AERATION UNITS
FULLER DIVERTING VALVES
FULLER-DRACCO DUST COLLECTORS
TRAYLOR GYRATORY, ROLL and JAW CRUSHERS
TRAYLOR BALL, TUBE and ROD GRINDING MILLS
TRAYLOR ROTARY KILNS, DRYERS and SLAKERS
TRAYLOR FEEDERS: COPPER CONVERTERS

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| SAN FRANCISCO, CALIF. | YUkon 6-5486 |
| SEATTLE, WASH. | MUtual 2-3131 |

*(Continued from page 76)*

## Dust control

MORE AND MORE rock products producers are finding that dust control will improve worker efficiency and reduce dust contamination of their products. And they are putting in more dust control systems, even when they're in remote locations away from populated areas.

A western cement producer has a large spray nozzle right above the primary gyrator to help suppress dust when trucks dump their loads. Any dust that escapes the spray tends to be caught in the suction vents which lead to a bag collector. This collector has ducts leading to the apron feeder and the conveyor loading point far below the crusher.

The combination of both sprays and collectors is rather unusual. Most rock crushing plants depend entirely upon sprays—plain water or water with wetting agents added. Cement plants appear to have a definite preference for bag collectors with dust merely returned to the system.

As more producers install air-conditioned control rooms and offices, more of them will probably decide that it's cheaper to suppress dust where it starts, rather than let it get into the rather costly air-conditioning equipment.

The photo shows how a western cement maker has put his dust control system near a battery of screens and group of belt conveyors which serve the screens.

## Pneumatic tube systems

SEVERAL CEMENT PLANTS have adopted pneumatic tubes for fast internal communications. A western cement plant uses these capsules to transmit samples from the sampling station to the laboratory. Result: the laboratory comes up with an analysis fast enough to make changes while the material is still in the processing circuits.

Another cement plant uses pneumatic tubes to send shipping slips from the packhouse office to the weighmaster. He, in turn, sends the stamped, attested shipping documents back to the office faster than it takes to tell about it. And the billing department has shipping notices and invoices on the way almost as fast as the shipment of cement.

## Pry-bar

HERE'S A PRY-BAR that can be just as strong as a solid steel bar, yet many pounds lighter. The secret is to use a 1¼ or 1½-in. diam. duraluminum pipe or solid round and fit it with a steel tip. The steel point can be forged to just the shape desired, and the end formed either to fit inside the pipe or over the end of a solid bar.

Aluminum rod or pipe is available from many mill supply houses or steel warehouses and can be cut to length to suit the bar-man's preference.

**Warren Cross, Oak Ridge, Tenn.**

**END**


Screen Story...

*Mr. Howard McClintock, plant superintendent for Santiago Aggregates, Orange, California, watches one of their top quality washed products come over the upper deck of a 5' x 12' Overstrom Double-Deck Screen equipped with water sprays. This 250 TPH plant utilizes Overstrom Vibrating Screens throughout — from bull screen to final sizing.*

Rock plants the world over *make more money* with Overstrom Vibrating Screens. *Moderate first cost — superior reliability — easy maintenance!* — these are features you'll profit from when you buy Overstrom.

Every model has Overstrom's quick-change vibrator cartridge unit with oil-bath bearing lubrication; custom-built spiral suspension springs; steel castings throughout; and many other important *"plus"* features.

Want to see more photos of *"Overstrom On The Job"?* Drop us a line and we'll add you to our mailing list.

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# CONVEYOR SYSTEM SUPPLIES AGGREGATES TO READY-MIX, BLOCK AND PIPE PLANTS

This efficient, economical 5-unit Barber-Greene belt conveyor system supplies all aggregates to the concrete block pipe and ready-mix operations of Pinellas Industries, Inc., St. Petersburg, Florida.

"Our Barber-Greene conveyors have given us seven years of dependable operation, handling 15,000 tons of aggregate monthly for a total of 1,260,000 tons," reports Terry B. Peacock, vice-president and general manager.

"Maintenance per ton handled has been very low . . . no carrier replacements," he adds.

All conveyors have 24″ belts, total 929′ in length and have a 300 tph capacity.

The several sizes and types of aggregate required arrive in bottom dump rail cars. Stockpiling flow pattern: From cars into track hopper which discharges onto 193′ inclined conveyor leading to reversible shuttle conveyor high above four stockpiles that are kept free of contamination by bulkheads. Shuttle conveyor also charges ready-mix plant directly.

Reclamation of aggregates as needed is by tunnel-housed 295′ conveyor located beneath stockpiles. Hand-operated clamshell gates drop material onto conveyor which discharges onto 285′ inclined conveyor leading to central control turnhead atop batching plant. Use of bypass chute fitted to turnhead assembly permits discharging aggregate onto 63′ conveyor supplying pipe plant.

Get this same lowest-per-ton-cost material handling efficiency for your pit, quarry or concrete products plant by calling your Barber-Greene Conveyor Specialist. His Standardized Conveyors, made of pre-engineered and pre-aligned components, plus Barber-Greene's 40 years of design experience can lower your original investment and your maintenance costs.

Overall view of Pinellas Industries, Inc. three plants, all served by a one-man-operated Barber-Greene conveyor system. Seven year production: 33,600,000 concrete blocks, 103,000 concrete pipe joints ranging from 12-60" inside dia. and 346,400 yards of ready-mix for an all-truck fleet.

Aggregate classification and stockpiling is neatly handled by this 93' reversible Barber-Greene shuttle conveyor above four storage areas. Shuttle also feeds belt conveyor charging new ready-mix plant directly.

Closeup of conveyor that reclaims from stockpiles and charges central control turnhead atop batching plant.

## Send for new Idler bulletin

New 44-page Idler Bulletin describes the more than 800 units available in the complete Barber-Greene line, tells how their years-ahead features bring longer life and greater economy to every job. Ask for your copy today.

***Your belt conveyor equipment headquarters***

Representatives in Principal Cities of the World

**Barber-Greene** BG

Main Office and Plant AURORA, ILLINOIS, U.S.A.

Plants in DeKalb, Illinois, Detroit, Canada, England, Brazil, Australia

CONVEYORS • LOADERS • DITCHERS

• ASPHALT PAVING EQUIPMENT

# FACES & PLACES

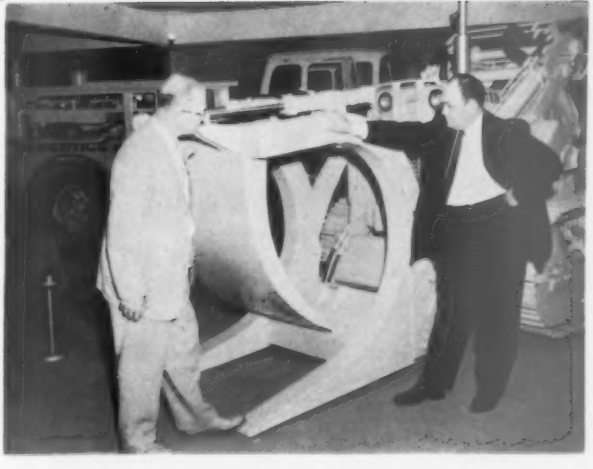
## CANDID SHOTS OF PEOPLE IN THE ROCK PRODUCTS INDUSTRY

UNDERWATER OPERATOR—Art Marchetti, pump department inspector at the Chicago Heights plant of American Manganese Steel Div. checks spider socket of 5-ft. cutterhead to be used in dredging. A one-piece casting in austenitic manganese steel, cutterhead will revolve at bottom of lake or river, cutting and loosening sand and gravel so that it can be sucked up a 12-in. pipe from center of cutterhead by pump on dredge.

FIRST IN SAFETY—Clipper Belt Lacer Co. and Grand Rapids Gravel Co. were named top firms for safety improvements in 1959. Awards were made at the annual meeting of the Greater Grand Rapids Safety Council and presented by William H. Nicholls, Jr. for the safety council (second from the left) and Wilburt J. Smale, representing the Michigan Mutual Liability Co. (right). Receiving the awards are Earl Scruby (left) and John Dalman (second from the right).

PROSPECTIVE CUSTOMER—Preflight instructions for operating the hydraulic controls of a crane was a feature of the recent National Sand and Gravel Association show at the Coliseum in Chicago. Emil E. Weis, Jr., advertising manager of Link-Belt Speeder Corp., stands by as a prospective customer puts a machine through its paces.

TAX TIME APPROACHING SOON—With income tax time coming up for almost everyone, there was an overflow crowd to hear Dana Latham, Commissioner of Internal Revenue at the National Sand and Gravel convention. At left, presiding officer Fred P. Curtis yields the microphone to Mr. Latham.



INDUSTRIAL PRESS IN MIAMI—At the J. I. Case 1960 World Premiere of equipment, the company entertained representatives of the industrial press at the Americana Hotel in Miami Beach, Fla. Here Marc B. Rojtman, special advisor to the president and the Case executive committee, shows Albert Arnst, editor of the Timberman, a special attachment for a diesel-powered crawler tractor.

Here's typical fast Michigan Model 275A loading: two passes of 4½ yd bucket, 40 seconds heap 10 ton truck.

Model 275A bucket-loads average 4.50 yards, 5.85 tons each, per scale-measurement.

Frequent Michigan odd-job: cleanup after blasting. Unit works much faster than crawler-dozer, has added advantage of being able to bucket-lift rock higher than can blade.

Michigans move fast around the quarry, average 18 mph, often hit top of 28 mph.

Here's an unusual but profitable market for LaGace: ⅛" stone for ice control. Last year, the company sold over 25,000 tons to airports and highway commissions. Like most limestones, this material contains small percentage of salt. Thus it has advantage of sticking to ice and not rolling off like sand. The result: better traction for airplanes and cars. Some of the material is stored under cover and sold dry; other customers prefer to buy from this open stockpile. The LaGace firm also makes substantial sales to the concrete industry (mostly ¾" to 1½" unwashed stone) . . . asphalt producers (200 mesh) . . . roofers (⅛") . . . paving contractors (½" to 4") . . . and fertilizer plants (5 mesh).

*There are, in Quebec, 27 major stone quarries. Almost all of them, 25 to be exact, do their stockpile loading with Michigan Tractor Shovels*

## The amazing record of one machine at one pit:

# 416 TRUCKS LOADED IN 8 HOURS !

Production like this certainly *helps* explain the popularity of Michigan Tractor Shovels.

But there are other reasons for this popularity—reasons which *might be of great importance in YOUR profit picture.* As a case in point, let's take ownership in Quebec, Canada.

In Quebec, over 90% of all the major rock quarries use Michigan Tractor Shovels for stockpile loading! This overwhelming preference, this record of buying and rebuying at this location, we feel, is particularly significant. For in Quebec, machines are tested by terrific extremes of *working* temperatures—40° *below* to 110° above. Tonnage demands are increasing rapidly. Distances are great and job sites are often hundreds of miles from repair and maintenance facilities.

### Repeat buyer likes Michigan dependability, dealer service

One typical Quebec owner—LaGace Quarries Ltd, Montreal—exemplifies the reasons for Michigan popularity under these conditions. "Michigans usually load faster than other Tractor Shovels," says Paul LaGace. "Hence they produce more. Michigans cause less trouble, mechanically speaking. And when something does go wrong, we get excellent service from our Michigan Distributor (Blackwood-Hodge Ltd) and from Clark Equipment Company."

The LaGace firm reports from long experience. They bought one of the first Michigan Tractor Shovels sold in Canada—a 1¼ yd Model 75A—in 1954. Today, they own six Michigans: the original Model 75A, two Model 175A's equipped with 2¾ yd buckets, and three Model 275A's with 4½ yd buckets.

### 20 seconds per bucket load

Loading with *any* of these units from *any* of 22 crushed stone stockpiles—4" and run of crusher to lime dust—takes an average of only 20 to 25 seconds per pass, according to company time-study averages. Thus, a skilled operator and a 4½ yd Model 275A regularly heap a 25 ton hauler in five passes, under 2 minutes. A 12 ton tandem-axle truck takes a 275A two passes, 40 to 50 seconds. Top daily load count, so far, for a Model 275A has been an amazing 416 trucks, 10 to 15 tons each, in 8 hours! Production, overall, with the six Michigans loading at LaGace's two pits, has averaged 1,000 to 2,000 tons hourly—over three times as much as before Michigans.

### Other jobs: loading shot rock, cleanup after blasting, etc.

The Michigans do a lot of odd jobs too. In emergencies, they have loaded quarry rock. Several of the units often handle cleanup after blasting, dozing and lifting material into high, centrally-located shovel-efficient piles. At times, they clean spillage from haul roads and crusher sites. They tow stalled vehicles. In winter, they plow snow. As Raoul Savage, quarry supt, puts it, "*Whenever we want to lift or haul anything, we just call for one of the Michigans.*"

Good advice! If you *don't have* a Michigan—or if you'd like to see the performance advantages of our *latest models*—call your Michigan Distributor for a demonstration. Pick the size you want to see—nine models, with buckets from 16 cu ft to 10 cu yds, 3,000 to 30,000 lb lift capacities.

Michigan is a registered trademark of

**CLARK EQUIPMENT COMPANY**
**Construction Machinery Division**

CLARK EQUIPMENT

2481 Pipestone Road
Benton Harbor 11, Michigan
In Canada:
Canadian Clark Ltd.
St. Thomas, Ontario

Michigan's primary job: cleaning around two 6-yd shovels, usually spotted 1,500 to 1,800 ft apart.

Typical Michigan odd-job: centrally stockpiling oversize rock chunks for secondary breakage.

To clean and pile average 40,000 ton blast takes the high-speed 56,000 lb Michigan only half a day.

Job-to-job moves are made at truck-like speed. Unit's tires roll easily over the rocky footing so abrasive to tracks.

*One 262 hp Michigan Dozer does work of two big crawlers: cleans around two 6-yd rock shovels, also piles blast rock at Huron Portland Cement Company quarry.*
*A typical saving:*

# 60% CUT IN SHOVEL CLEANUP TIME

At least three important savings have been realized by the Huron Portland Cement Company quarry, Alpena, Michigan, since their 262 hp Michigan Tractor Dozer took over pit maintenance duties.

**ONE,** the Model 280 Michigan Tractor Dozer and its one operator do the work of two 28,000 lb class crawlers and two operators.

**TWO,** Michigan tires have eliminated annual or bi-annual track rebuilding. Tires on the Model 280 are expected to last "about twice, maybe three times as long as tracks," say men on the job...an estimate based on the quarry's three-year experience with a smaller (162 hp) Model 180 Michigan Dozer, recently moved from the quarry to the company cement plant.

**THREE,** the Michigan, with its high speed and power, saves time on almost every individual cleanup chore. To be sure, this saving may be only 2 to 5 minutes per job . . . but added up over 6 days a week, 52 weeks a year, the sum total makes an important contribution in more loads delivered, quarry face to crusher grizzly.

For instance, take the saving in shovel cleanup. Back in Huron Portland's crawler days, a good operator could clean the spillage around one shovel in 5 minutes. While the crawler dozed, the 6 yd electric shovel couldn't load (primarily because its power cable blocked one side). Today, the shovel still cannot load during cleanup. But the high-speed Michigan does each cleanup in 2 minutes! Thus, 3 minutes are saved. Three minutes saved, 8 to 12 times a day, *at each of Huron-Portland's two 6-yd electric shovels.* That's 5 to 7 extra 26 to 27 ton truck loads *from each shovel* each day—260 to 360 extra tons of stone each day for the crusher (and the cement plant).

### 75% cut in blast cleanup time

Another example of time saved is in blast cleanup. One to four times a week, Huron-Portland's crew shoots the 100 ft high quarry face. Each blast breaks up 35,000 to 45,000 tons of limestone. Trouble is, some rock gets thrown 100 to 200 feet, sometimes 300 ft. Used to take a crawler one to two days to police the area and gather all the rock. Now, the Michigan Tractor Dozer does the policing job in half a day. (Here is one place the 262 hp Michigan Model 280 noticeably outperforms the 162 hp Michigan Model 180 used so successfully for three years. The bigger Model 280 can move heavier rock . . . can often do in two passes what took the Model 180 four passes . . . and it can pile the rock several feet higher.)

### Stockpiles oversize rock . . . biggest chunk moved, 16½ tons

Being the only *mobile Dozer* in the 450 acre pit means the Michigan does lots of odd jobs too. It moves drilling machines, air compressors, and shanties. It cleans spillage from the 2,000 ft of shovel-crusher haul road. Cleans around the crusher. Drives a mile to the cement plant to stockpile coal, when necessary. Moves power cable for the shovels. In winter, it keeps roads and building areas free of snow. It even moves oversize rock chunks away from shovel for secondary breakage. Biggest rock chunk dozed by the Model 280, to date, measured 4x5x10 ft, weighed about 33,400 lbs.

### Check performance on your job

We'll bet a Michigan Tractor Dozer can break production bottlenecks for you, too. Won't cost you a cent to find out—your local Michigan Distributor will be glad to arrange a thorough demonstration. You pick the time . . . the job . . . and the model Michigan Tractor Dozer (162, 262, 375, or 600 hp) you want to see. No obligation, of course.

Michigan is a registered trademark of
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*Link-Belt photo*

TOMORROW'S CEMENT PLANT
is an integrated
processing machine
from quarry
to shipping dock . . .

. . . eliminating
individual control of
each step
in the process

*Leeds & Northrup photo*

ROCK PRODUCTS
May 1960

# Will expansion bring prosperity?

## *Here's the outlook for the cement industry in the "soaring sixties"*

MASTER PLANNING BY THE CEMENT INDUSTRY is a vital requisite if projected goals are to be reached in the "soaring 60's." The job will be too big to be solved with half-way measures.

Management will have to bear the major load—beginning now—in the herculean task of solving financial, production, educational and other problems. "What's different about that?" some may ask. A big difference lies in the huge volume of plant capacity that may be needed between now and 1970, and the effect of ever-increasing technological progress that must be considered.

It would appear that outside specialists in such fields as engineering—especially industrial—and educational training may be used to assist management in the future. Employment of technically trained electronic engineers as regular staff members is more than a slight possibility. The comptroller and maintenance specialists could be management's most valuable team members by 1970.

Take a look at the cement industry as projected for 1970, and the magnitude of problems involved in building plant facilities will become apparent. Annual output may be slightly more than 600 million bbl. from 260 plants that have facilities for producing 670 million bbl. a year. The modern plant may be controlled, from quarry through product load-out facility, from one central control console operated by one man.

Nearly 200 million tons of raw materials, from limestone and shells to air-entraining compounds, may be needed in the manufacturing process. About 16 million tons of coal, 550 million gal. of oil and 250 million cu. ft. of gas may be needed to supply fuel requirements.

Product quality and uniformity will be greatly improved, due to the increasing trend toward instrumentation. In some cases, plants may be fully automated. Generally, equipment will be larger, and average size of plant in annual capacity may be 11 percent bigger than in 1960.

By 1970, most plants will be structures of beauty architecturally but will be designed along functional lines. Most old plants—at least 30 percent of present plants are 30 years old, and found mainly in the East—will be replaced by new ones. This, plus the fact that dust control and other production problems will be eased through progress in technology, will greatly improve the industry's position with the public. The industry, through the 1960 decade, will approach more closely its deserved position as one of the most important segments of the national economy.

**Basis for this projection** of a greatly magnified and improved industry in 1970 lies in studies of two general areas: (1) demand for product and (2) industry improvement. Primarily, a review of the industry's movement in these areas during the past decade set the stage for projecting 1970 goals. Data from government and industry sources were used for that review. Personal comments and expressed opinions of individuals in the producing, equipment manufacturing and other related segments of the industry were of inestimable value in helping to establish the signposts to future progress. We are deeply grateful for that cooperation and assistance.

### Cement demand to soar

Demand for cement, represented by production data, increased 50 percent from 1950 through 1959. Since demand is related so closely to the country's rate of new construction, a review of that area was advisable. That relationship showed a gradual increase in favor of cement use during

*Please turn page*

**BIG MATERIALS HANDLING EQUIPMENT** came into its own in the 1950's—the end is not in sight for even bigger machinery

**SKILLED MAINTENANCE** of automatic controls becomes vital

*Leeds & Northrup photo*

**AUTOMATIC CONTROLS** make it possible for one man to supervise the entire cement-making procedure from a central location

*Ideal Cement photo*

*continued from page 91*

the 1950 decade. In other words, the number of barrels of cement used per $1,000 of new construction increased slightly during the 1950-59 period. The relationship is true only if dollar volume of new construction is converted to constant dollars through use of the consumer price index for construction materials.

Average use of cement during the 1950 decade was 8.5 bbl. per $1,000 of new construction adjusted for inflation. Projection of the growth in that ratio, when applied to estimated growth in adjusted new construction, shows a possible 604-million-bbl. output by 1970.

A study of trends in population increase and cement use per capita, based on 1950-59 experience and future estimates, serves to check the projected 1970 cement output. Per-capita use of cement is rising, having reached 1.96 bbl. in 1960. It is expected to reach 2.80 bbl. by 1970.

Experts agree that our general economy will expand during the 1960's. Cement use will surely rise to no less than an equal rate, to keep in step with an ever-increasing dollar volume of construction. One business analyst has this to say about it: "The growth in cement shipments during the last decade has slightly exceeded the rate of expansion in general industrial activity. Prospects for the continuance of this favorable relationship in the next decade also seem promising." Add to that the prediction of Dr. A. Allan Bates, Portland Cement Association (see page 107): "At present, new construction accounts for about 11 percent of the gross national product . . . By 1970, this figure will rise to 14 percent—and the ratio of concrete in relation to other building materials will double!"

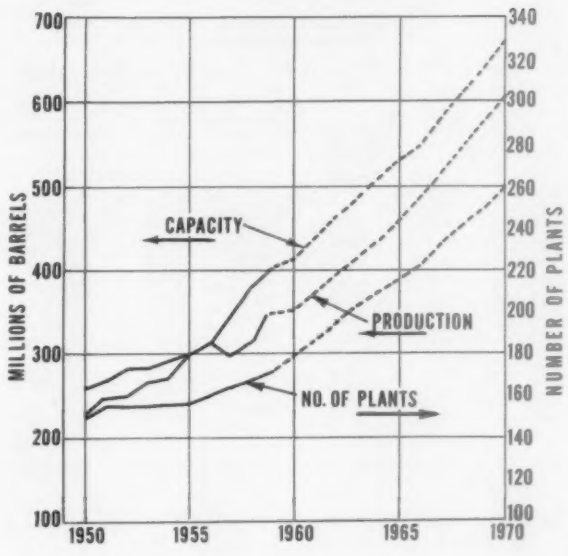
The pattern for an expanding cement industry during the 60's seems clear.

**How big an industry will be needed** to produce 604 million bbl. a year in 1970? First, consider the 1950-59 experience in operating rate (output as a percent of capacity). It averaged 90 percent during the period, believe it or not, hitting a high peak in 1956 or more than 100 percent. But it had fallen to 84.1 by 1959, due to the huge expansion program the industry completed in the 1956-1959 period. Assuming a gradual return to the 90-percent rate by 1970, capacity required to produce 604 million bbl. 10 years hence is 671 million bbl. That represents a 62-percent increase above today's estimated capacity.

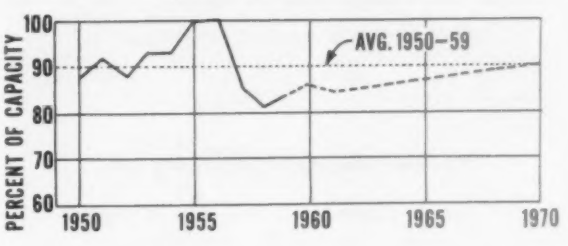
It is not easy to guess the number of plants re-

*Please turn page*

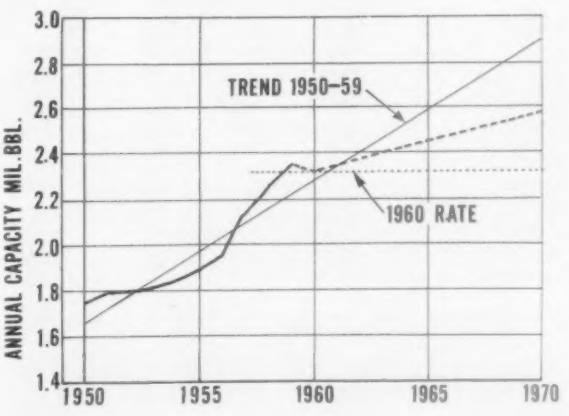
**Cement industry looks up**




**Operating rate held high**




**Cement plants getting larger**



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### Cement output grows with construction increase

Table 1—Cement production compared with dollar volume of new construction

| Year | 1 New construction (Billions of dollars)[a] | 2 Consumer price index[b] | 3 Adjusted new construction (Billions of dollars)[c] | 4 Cement production (Millions of bbl.)[d] | 5 Bbl. per $1,000 new construction (Adjusted)[e] |
|---|---|---|---|---|---|
| 1950 | 30.0 | 108.9 | 27.6 | 226.0 | 8.2 |
| 1951 | 32.7 | — | — | 246.0 | — |
| 1952 | 34.8 | 118.3 | 29.4 | 249.3 | 8.5 |
| 1953 | 37.1 | 120.2 | 30.8 | 264.2 | 8.6 |
| 1954 | 39.6 | 120.9 | 33.8 | 272.4 | 8.1 |
| 1955 | 44.6 | 125.6 | 35.5 | 297.5 | 8.4 |
| 1956 | 46.3 | 132.0 | 35.0 | 316.4 | 9.1 |
| 1957 | 48.1 | 132.9 | 36.2 | 298.4 | 8.3 |
| 1958 | 48.9 | 132.9 | 36.8 | 311.5 | 8.5 |
| 1959 | 54.3 | 134.0 | 40.5 | 338.5 | 8.4 |
| 1960 | 55.3 | 134.6 | 41.1 | 352.0 | 8.6 |
| 1965 | 72.0 | 138.0 | 52.1 | 459.0 | 8.8 |
| 1970 | 95.0 | 141.4 | 67.1 | 604.0 | 9.0 |

[a]Bureau of Census, U. S. Dept. of Commerce, 1950-59. Estimated 1960-1970

[b]Bureau of Census, U. S. Dept. of Commerce, 1950-59. Estimated 1959-70 based on trend 1956-58

[c]Estimated and calculated 1950-1970 based on dividing data in column 1 by data in column 2

[d]Bureau of Mines, U. S. Dept. of Interior, 1950-59. Estimated 1960-70 based on data in column 3 multiplied by data in column 5

[e]Calculated from data from Bureau of Census, U. S. Dept. of Commerce; Bureau of Mines, U. S. Dept. of Interior, 1950-59. Estimated 1960-70 based on projection of 1950-59 trend

### Number and size of plants will grow

Table 2—Cement production and size of plants

| Year | 1 Cement production (Millions of bbl.)[a] | 2 Operating rate (% capacity)[a] | 3 Industry capacity[a] | 4 Avg. size of plants (Million bbl. annually)[b] | 5 Number of plants[c] |
|---|---|---|---|---|---|
| 1950 | 226.0 | 87.3 | 258.9 | 1.75 | 148 |
| 1951 | 246.0 | 91.7 | 268.3 | 1.79 | 155 |
| 1952 | 249.3 | 88.6 | 281.5 | 1.80 | 156 |
| 1953 | 264.2 | 93.2 | 284.0 | 1.82 | 156 |
| 1954 | 272.4 | 93.6 | 291.8 | 1.85 | 157 |
| 1955 | 297.5 | 99.9 | 298.0 | 1.90 | 157 |
| 1956 | 316.4 | 100.1 | 315.3 | 1.97 | 160 |
| 1957 | 298.4 | 85.5 | 349.4 | 2.13 | 164 |
| 1958 | 311.5 | 81.9 | 380.4 | 2.26 | 168 |
| 1959 | 338.5 | 84.1 | 402.8 | 2.35 | 171 |
| 1960 | 352.0 | 85.2 | 413.6 | 2.32 | 178 |
| 1965 | 459.0 | 87.0 | 528.0 | 2.45 | 215 |
| 1970 | 604.0 | 90.0 | 671.0 | 2.58 | 260 |

[a]Bureau of Mines, U. S. Dept. of Interior, 1950-59. Estimated 1960-70

[b]Calculated from data from Bureau of Mines, U. S. Dept. of Interior, 1950-59. Estimated 1960-70

[c]Bureau of Mines, U. S. Dept. of Interior, 1950-59. Estimated 1960-70 based on dividing data in column 3 by that in column 4

quired to provide this capacity. Some feel that plants will continue to increase in size, as they did during the past decade. Data show that average plant size jumped 34 percent from 1950 to 1959—from 1.75 to 2.35 million bbl. annually. If the rate of increase holds for the next decade, the average plant would produce 2.9 million bbl. a year by 1970.

That rate of growth may be exaggerated for this decade, since increasing population density may narrow the market area per plant. Some expressed an opinion that rising population and higher freight rates may narrow the marketing area to the extent that the average plant in 1970 may be smaller than today's. Our calculation is based on simply halving the projected 1950-59 rate of increasing plant size. On that basis, it may require 260 plants to provide the capacity for producing 671 million bbl. of cement in 1970. Average plant size is projected at 2.58 million bbl. per year by that time.

**The industry building job** for this decade thus appears to be monumental. During the next 10 years about 80 new plants must be built to reach the projected goal. Astounding as this may seem, such a building job is not much greater than the industry completed during the 1956-1959 period when 31 new plants were installed. The projected program is 29 percent greater than that average.

There apparently will be a changing trend this decade in the source of new cement manufacturing capacity. During the 50's, an estimated 87 million bbl. of capacity (60 percent of total) were added through enlarging existing plants. The rapid rise in the rate of applied technology, plus the fact that between 30 and 50 percent of the present plants are old and inefficient by present standards, indicates future accent on new plant construction.

**Plant construction may require $2.8 billion** in capital investment during the next 10 years. If projection data are valid, 200 million bbl. of capacity (78 percent of total projected increase) will be added through building of new plants. The remaining required 57 million bbl. of capacity will be added to existing plants.

## Industry improvement phenomenal

There probably has been more technological improvement in the cement industry during the 1950 decade than all previous improvement put together. Bigger equipment, ammonium-nitrate explosives, industrial television, X-ray diffraction,

nuclear bed-depth controllers, complete instrumentation, digital computers—these and a myriad of other developments have been applied to greatly improve plant efficiency, product quality and uniformity. The high rate of improvement during the 50's places the industry in an excellent position to tackle the big job ahead.

There was a definite trend toward the use of larger equipment during the 50's. Some producers adopted the plan to use the largest equipment possible and to operate it at highest efficiency. This held for equipment in quarry and plant.

Size of raw grinding mills grew from 10½ ft. diam. in about 1950 to 13 ft. diam. in 1960. Required horsepower jumped from 1,000 per mill to as much as 2,500. An opinion is that 4,000 hp. mills with 14 to 15-ft. diameters are a definite possibility. It appears that high capacity in a single unit is what the industry wants, and is getting. The apparent limitation on size of units made available to producers is facility for shipping them.

**A relatively new innovation** is the use of a rod mill ahead of a ball mill, which works essentially as a closed circuit. Some believe that rod mills may be used eventually on clinker.

Size of cement kilns in use has followed the trend toward bigger equipment. Desire for larger capacity and better efficiency in a single unit has prompted the move to bigness. But there are additional advantages, such as an estimated 15 percent lower cost and reduced labor requirements.

The largest known kiln today is an 18½ x 600-ft. unit with rated capacity of 12,000 bbl. per day. A year ago, opinion was that the trend toward use of larger kilns had reached its peak—that maximum fuel efficiency had been reached for rotary kilns. There apparently is no radical departure from that opinion today. But, again, the major limiting factor on size of kiln manufactured, or to be made, is availability of adequate shipping facilities. Plants located on navigable water have an advantage in this connection.

**Big trend is toward complete instrumentation** and centralized control in the industry. Much progress has been made in the past few years. Several major companies have applied electronic controls successfully. Most new plants have central panels for remote-control operation. Beyond that, some even have included facilities in the central control room for operating crushing plants and conveyor systems.

Table 3—New portland cement plants, 1956-60

| Cement firm | Location of new plant | Design capacity (bbl.) | Estimated total cost |
|---|---|---|---|
| **Plants completed in 1956** | | | |
| Bessemer | Bessemer, Pa. | 1,350,000 | $ 5,500,000 |
| California Portland | Mojave, Calif. | 2,000,000 | 12,500,000 |
| Peerless | Detroit, Mich. | 1,250,000 | 7,000,000 |
| **Plants completed in 1957** | | | |
| American-Marietta | Roberta, Ala. | 1,500,000 | $ — |
| Consolidated | Paulding, Ohio | 2,500,000 | — |
| Lehigh | Union Bridge, Md. | 3,100,000 | 21,000,000 |
| Lone Star | Lake Charles, La. | 2,000,000 | 14,000,000 |
| Marquette | Cape Girardeau, Mo. | 1,250,000 | 7,000,000 |
| Marquette | Milwaukee, Wis. | 1,250,000 | 7,000,000 |
| Permanente | Cushenbury, Calif. | 2,500,000 | 12,000,000 |
| Texas Portland | Orange, Tex. | 700,000 | 6,000,000 |
| Universal Atlas | Buffington, Ind. | 3,000,000 | — |
| **Plants completed in 1958** | | | |
| Alpha | Lime Kiln, Md. | 2,000,000 | $18,000,000 |
| Arkansas | Foreman, Ark. | 1,400,000 | 12,000,000 |
| General Portland | Miami, Fla. | 2,500,000 | — |
| Ideal | Ada, Okla. | 1,500,000 | 16,000,000 |
| Ideal | Houston, Tex. | 2,800,000 | 16,000,000 |
| Lehigh | Miami, Fla. | 2,500,000 | 25,000,000 |
| Medusa | Wampum, Pa. | 1,600,000 | 12,000,000 |
| Mississippi Valley Portland | Vicksburg, Miss. | 700,000 | 3,800,000 |
| **Plants completed in 1959** | | | |
| American Cement | Clarkdale, Ariz. | 1,500,000 | $16,000,000 |
| Columbia-Southern | Barberton, Ohio | 1,500,000 | 7,000,000 |
| Hudson Cement | Kingston, N.Y. | 900,000 | 3,750,000 |
| Ideal | Tijeras, N.M. | 1,250,000 | 14,000,000 |
| Southwestern | Odessa, Tex. | 1,250,000 | 12,000,000 |
| **Plants under construction in 1960** | | | |
| Calaveras | Redding, Calif. | 1,500,000 | $14,000,000 |
| Dewey | Tulsa, Okla. | — | 12,000,000 |
| Dundee | Dundee, Mich. | 5,000,000 | 25,000,000 |
| Ideal | Clarkston, Wash. | 1,500,000 | 14,000,000 |
| Oklahoma Cement | Pryor, Okla. | 1,000,000 | 7,000,000 |
| Texas Industries | Midlothian, Tex. | 1,400,000 | — |

It is reported that the kilns are now being operated by remote control better than if they were attended by a burnerman on the firing floor. Industrial television, level indicators, slurry density controllers and all the normal electric controls and instruments make this possible. The big advantage accrues to the production supervisor, since by taking just a few steps he can know every minute what each piece of equipment is doing.

Yet, the industry is not completely sold on complete instrumentation and centralized control. Some feel that the disadvantages of more expensive maintenance, plus higher cost for control equipment, outweigh the advantages of such installations.

The trend, however, is definitely in favor of more controls. Some feel that complete automa-

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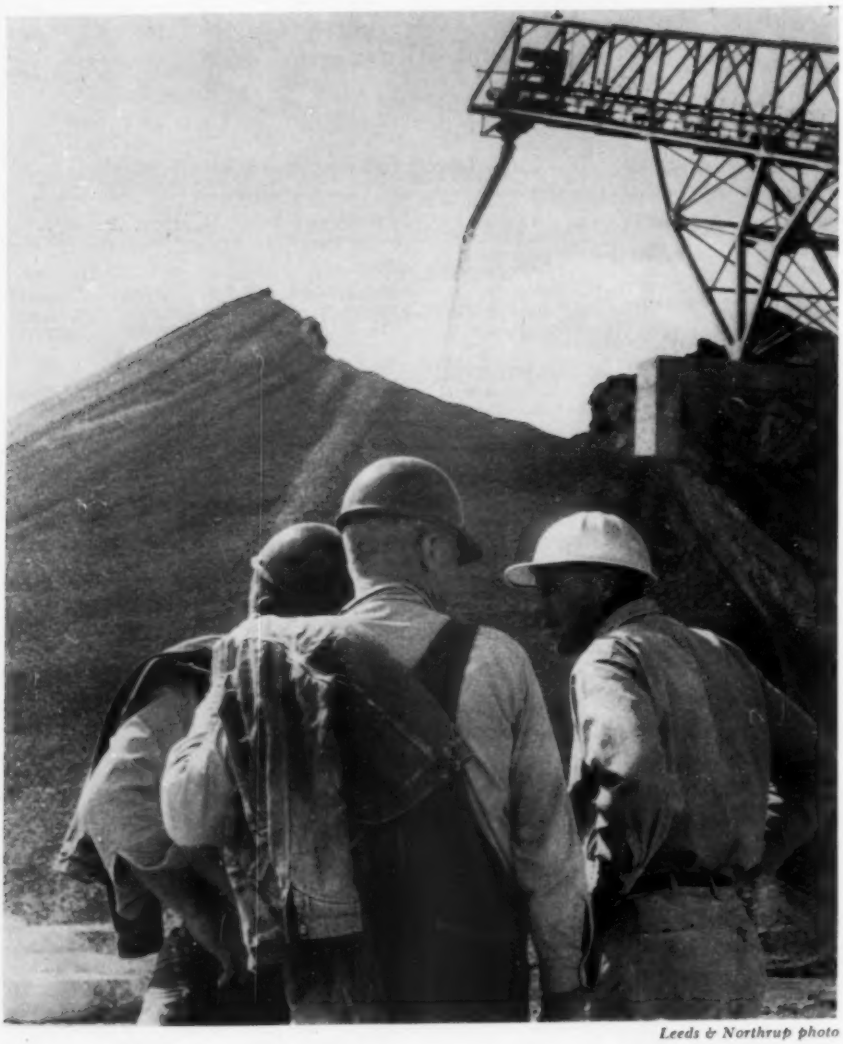

*Leeds & Northrup photo*

SUPERVISORS
will use industrial
engineering
techniques to quarterback
operating teams

*Thompson-Ramo-Wooldridge photo*

AUTOMATION
is one of 1970's
goals—the
first digital computer
is already at
work in the
cement industry

*continued from page 95*

tion may be achieved by 1970. It already has been tried by some companies, but abandoned. At least one company is using a digital computer on raw material supply and reportedly is experimenting with it on kiln operation. So, the foundation, at least, for future automation is already being laid.

By-product advantages of instrumentation have been noted. There has been an improvement in plant housekeeping because of it, and an accompanying betterment of safety experience. A major advantage is ability to manufacture a higher quality and more uniform product.

What about the future? Advantages in the use of fully instrumented and remotely controlled large kilns and mills point to their continued use—to the point of complete automation. Use of preheaters and improvement in heat transfer systems will continue the industry's effort to improve efficiency and product quality. Few believe that entirely new cement-making processes will come forward this decade, although research on some new methods is continuing.

Continued accent on development of improved equipment for use throughout the industry can be expected. For example, one equipment manufacturer has developed and applied a novel 2-motor drive for large grinding mills. Another has developed a computer system that will consider more than 100 variable items in determining exact size and type of kiln needed for a specific plant or operation. Similar efforts are being made by other equipment companies on virtually all types of materials handling and processing equipment.

## Pattern for the future

Progress in the past decade points to assurance of success in the future, even though growth will be accelerated. The industry is endowed with astute management that has a flair for anticipating future potentials and planning properly for them. This has been especially true during the 1950 decade. But new and intriguing problems are bound to arise with improving technology.

Consensus is that further improvement in all operating phases will be made. Yet, based on past experience, certain fields of endeavor may be accented the next 10 years.

**(1) Materials Handling.** Much progress has been made in the past decade toward more effective use of manpower through development and use of new materials handling equipment. Most feel that the future holds even more chance of improvement. Movement of materials is a vital phase of the business and, therefore, represents a field in which more new, economic advances will contribute much to reduction in operating cost.

**(2) Maintenance.** Plant maintenance will become even more vital to economic operation as equipment capacity and remote control of plant operations grow. Importance of reduction in work stoppages due to equipment or instrument failure will thus increase. Centralized control and its eventual extension toward automation will accent the need for electronic specialists on the production team.

Even now, some have experienced an increase in unit maintenance cost, but maintenance manpower has decreased. Others feel that the disadvantage of higher costs will continue, but not to the extent of overshadowing the advantages gained through application of interlocking systems of centralized control. The maintenance man will become more important to management as use of control equipment increases.

**(3) Industrial Engineering.** The program of introducing industrial engineering to cement-making operations has begun already. At least one company has reduced standards two percent a year as a result of methods improvement gained through use of such a program.

The real advantage will show up as an increase in productivity. The company noted above raised the rate an average of three percent annually for the past few years. In that plan, supervisory personnel participate in gains made through cost, methods and function improvement, making it an incentive system.

**(4) Educational Programs.** Training of specialized personnel through regular schooling programs will become more necessary as the industry approaches automation. Projected increase in technology will demand it. People will become more important in your operation, even though more dependence may be placed on instruments and controls. This may be a paradox in the move toward automation. Individual responsibility will be magnified for each man on the team.

No phase of operation will be slighted in development of educational programs. Supervisors must be trained for effective use of incentive plans. All must be made more cost conscious. Duties of power, maintenance, even safety personnel will change with the new demands placed upon them by a changing industry. *Please turn to page 204*

DUNDEE'S NEW PLANT has an initial rate of production of 5 million bbl. of cement a year. Indicated above are: (1) quarry containing clay and limestone deposits adequate for more than 100 years of peak production; (2) primary crusher which reduces limestone to size suitable for conveyor; (3) cement storage silos 150 ft. high, with rail and truck-loading stations; (4) conveyors and pipelines hauling raw materials and coal; (5) crushed limestone and coal storage area; (6) storage area for 200,000 tons of cement clinker; (7) main plant, housing the five largest grinding mills in the world; (8) two kilns 460 ft. long; (9) electrostatic precipitator area, where more than 99 percent of all suspended solids are removed from exhaust before discharge through stack 350 ft. high; (10) main office building

# Prescription for economy: build big

by John Hiltemann*

*Chief of Engineering Dept., Dundee Cement Co., Dundee, Mich.

IF I DID NOT HAVE THE COST FIGURES of Dundee Cement Co.'s new plant in southeastern Michigan to prove me right, I would expect to be challenged for this statement: A cement plant can be built at the remarkably low cost of $4.30 per bbl. of annual production! This $26-million newcomer to the industry went into production Dec. 29, 1959. How, you might ask, could we erect it so economically when other new plants built in the United States during the last five years have cost from $7 to $12 per bbl.?

I will begin my answer by saying that, for one thing, our plant is large—6 million bbl. annual capacity. Size in itself provides economies in construction and operation. But we knew from the first that we had to erect a plant approximating this low cost if we were to make it pay. Therefore, we did.

Plants costing $8 to $12 per bbl. seldom justify their investment. After all, compared to older plants, they permit a saving of only 40¢ to $1 per bbl. in production cost. Interest and depreciation costs range from 80¢ to $1.20. Investment for a new plant has to be less than 10 times the savings in production costs if the plant is to produce cement at a lower price than that of an older, fully depreciated plant. The Dundee plant, with its construction cost of $4.30 per bbl., and its low operating cost, is a shot at this target.

Our first job was to choose a plant site. This, in turn, was limited by two factors—market and

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## PRESCRIPTION FOR ECONOMY: BUILD BIG

*continued from page 99*

raw material. Normally, producers build their plants at the source of raw materials closest to the market. The Lehigh Valley is a typical example, where 17 plants producing 42 million bbl. are located in a 10 x 20-mile area.

Occasionally a plant is built away from the material source, but at the market center. Our main objection to this solution is that the extra cost for raw material transportation is a fixed increase to the cost price, and there is also the cost for transporting cement sold outside the market center.

As a third possibility, we could build the plant at the source of raw material, but farther away from the market than our competitors. This is a good idea when there is cheap water transportation available, particularly when it links the plant with a number of market centers. In that case, a plant of large capacity can be built.

We think we achieved the most favorable combination of the above factors by locating the plant at Dundee, Mich. It has been built at the raw material source closest to the Detroit market. What is more, it is within economical distance of the Cleveland, Chicago and Cincinnati markets. The price Dundee Cement has paid for this central location is that the plant has not been built on navigable water. Cement must be shipped to nearby Monroe, Mich., to gain access to Great Lakes and St. Lawrence Seaway markets.

Our raw material source is Dundee Limestone, approximately 40 ft. deep. There is an overburden of 40 ft., of which 30 ft. is clay. Sixty percent of this clay will be used in the slurry.

**In designing our low-cost plant,** no sacrifice was made with high standards of quality. Largely responsible is a compact and straightforward layout, with main equipment of the largest economical size, and with adequate, big, low-cost buffer stockpiles between the independent production phases. St. Lawrence Cement Co.'s engineering department was engaged to make this design and layout, to erect and start up the cement-making systems. Initial production, as I mentioned earlier, is 6 million bbl. This can be doubled with addition of equipment.

As you will note in the layout photo, the plant is, indeed, compact. The total net area occupied by buildings, galleries, equipment and material stockpiles comprises 60,000 sq. ft. The total gross area occupied by the plant, without quarry, is 30 acres. In an area 300 x 300 ft. are kiln discharge, raw and finish grinding, workshop, stores, laboratory, switchgear and production offices.

The straightforwardness is illustrated by the fact that the horizontal traveling distance of raw material from the primary crusher to the packing plant is 4,000 ft., whereas the large size of main equipment is shown by the following:

Slurry and cement mills .....12 x 36 ft.
Kilns .....15/16.5 x 460 ft.
Crane .....150-ft. span, 450 fpm. bridge speed
Slurry basin .....37 ft. deep x 120 ft. diam.
Precipitator .....240,000 cfm.

Every production phase finishes with a stockpile, and the new production phase starts with reclaim from this stockpile.

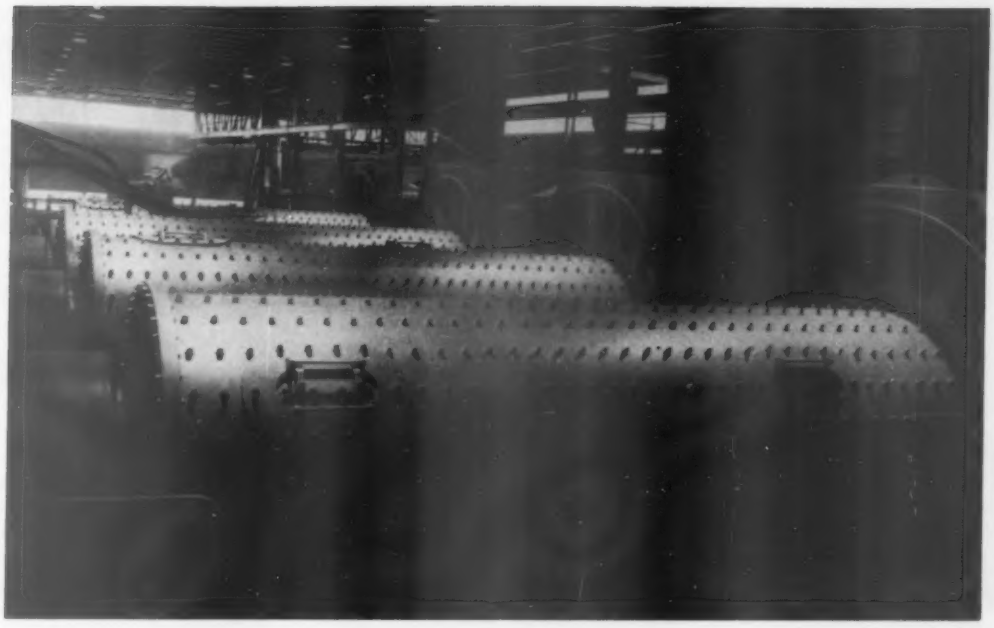
The capacity of the different departments and the size of the buffer stockpiles between them are:

| Department | Tph. | Tpd. | Average tons per week | Size of buffer stockpile—tons | | |
|---|---|---|---|---|---|---|
| Crushing | 720 | 5,500 | 26,500 | Limestone stockpile | = | 35,000 |
| Clay preparation | 300 | 2,200 | 11,000 | Clay slip basin | = | 6,000 |
| Raw grinding | 250 | 6,000 | 37,500 | Slurry basins | = | 26,000 |
| Burning | 140 | 3,400 | 23,000 | Clinker stockpile | = | 200,000 |
| Finish grinding | 225 | 5,500 | 25,000 | Cement storage | = | 55,000 |

The compact layout with large units automatically gives big savings in building costs; also, the auxiliary equipment will be more economical.

**The most important decision for the flow sheet** was the choice of raw material preparation—dry or wet. The advantages of the dry process were carefully considered: low fuel consumption; less dust circulation with pelletized feed, and standardization of raw and finish grinding with consequent simpler provisions for later extension. However, we finally considered that in spite of the theoretical saving of 300,000 Btu. per bbl., the actual saving is much less. The most favorable fuel consumption of a dry-basis kiln is 650,000 Btu., compared with 800,000 Btu. for a large, ultra-modern kiln, or a fuel savings of 4¢ per bbl.

The 4¢ saving is not sufficient to compensate for the extra trouble involved in the pelletizing of raw material; not for the extra maintenance cost of the Lepol grate, and the more expensive raw material silo battery, which have to be compared with



A BATTERY of five 12 x 36-ft., two-compartment tube mills, probably the largest in the world: the closest three are finish mills, the two in the rear are slurry mills. All are powered with 2,500-hp., 4,600-v. motors

RAW MATERIALS come into the new plant from the far left, behind the right storage silos for finished cement. Coal and limestone are stored at the far right

two simple slurry basins required for the slurry storage. The flow of material is normal for a wet-kiln process, with only the clay preparation as a new element.

**A completely new arrangement for the clay preparation** is called for. The clay is extremely sticky and contains 20 percent pebbles. Boulders over 24 in. are disregarded by selective clay excavation. The clay is dumped on an apron feeder and passes through an impactor into a log washer. In this washer about 60 percent of the slurrying action takes place.

The four axles have their paddles spaced in such a way that a transporting and self-cleaning action is obtained in addition to the slurrying action. From the log washer the coarse slurry, which

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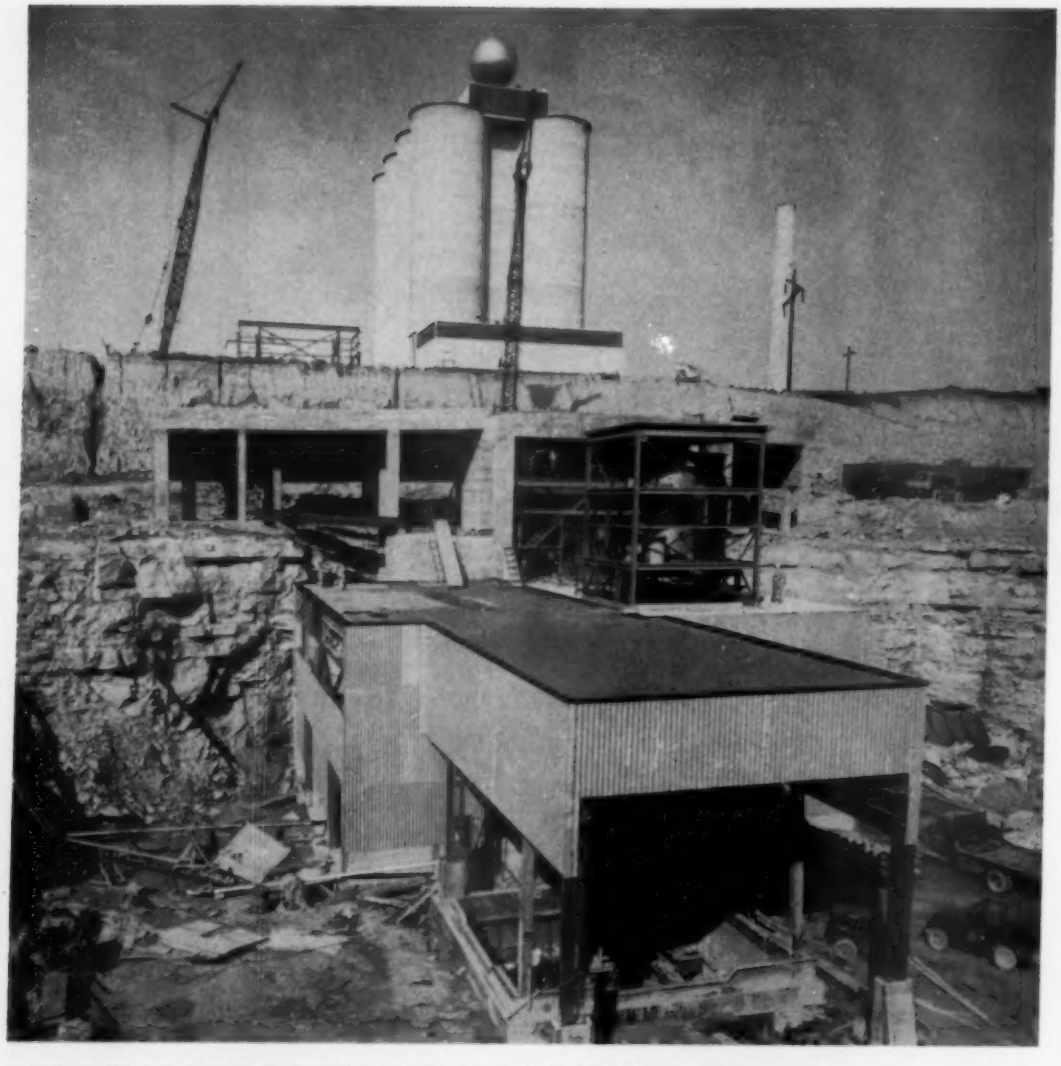
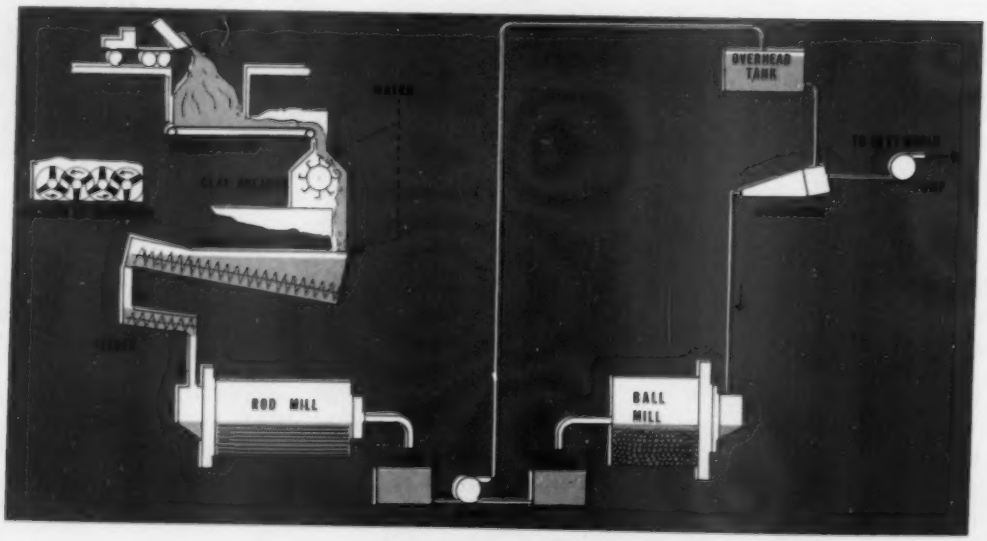


THE COMPLETED CEMENT-SHIPPING SILOS dominate this construction view of the raw material processing system which brings limestone into the new plant

CLAY requires careful preparation before it is ready for the mill circuits



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is still 20 percent clay lumps (3-in. max.) and 20 percent pebbles crushed to minus ½ in., is fed into the rod mill where the coarse particles are ground. From this mill the slurry is pumped over a system of five hydrocones, which separate the minus 50-mesh slurry with 65 percent water. The coarse material flows into a ball mill, from which it is pumped back to close the circuit, over the same five hydrocones.

Secondary crushing is done in open circuit. Screening follows this step, with coarse material over ½ in. passing through a tertiary crusher.

Final slurry preparation is done with two tube mills in series and with open circuit. Dust from the precipitator is returned to the kiln through the burner pipe, as it is for the other plants of St. Lawrence Cement Co.

The crane in the clinker storage hall is used only for spreading the clinker. The clinker is not loaded into silos, but the finish mills are fed by gravity directly from the 60-ft.-high storage pile. Silos are for storage of limestone, coal and additions.

Finish grinding is done in closed circuit, with two air separators for each mill, and separate air circulation for mill and separators. An internal spray system in the mills prevents dehydration of gypsum. Both raw and finish mills are fed by an automatic proportional feed system controlled by an electronic ear for maximum output.

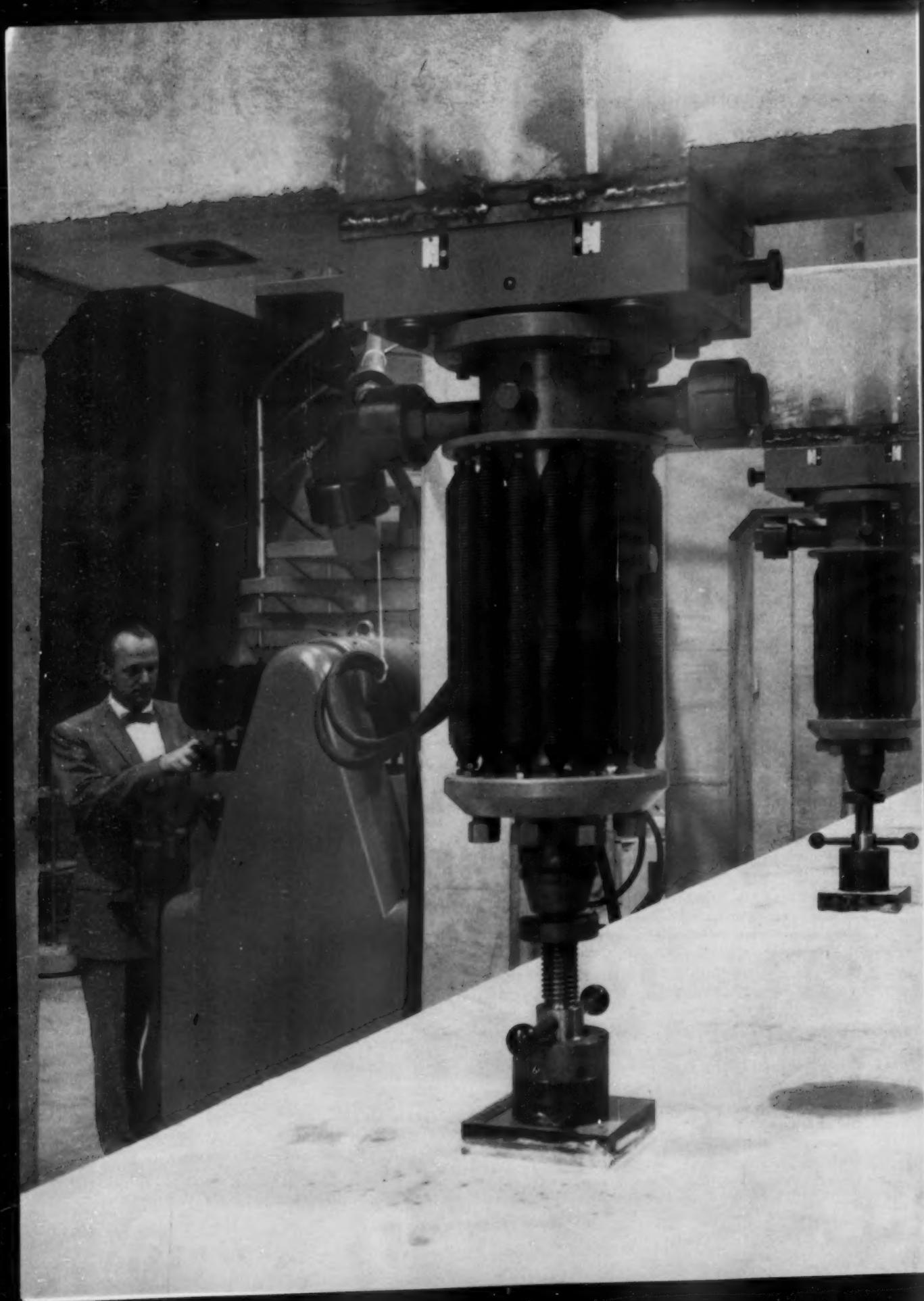
**Some facts about the construction progress** of Dundee Cement Co.'s plant may be of interest. It took about 18 months to build, during which 150,000 man days were worked on the field. Peak employment periods did not exceed 550 men. Equipment was ordered in August and September 1958; construction was started in June 1958, and erection of equipment was begun May 1, 1959. At that time all the concrete structures and concrete foundations, concrete roads with storm sewers, the workshop, stores and office building were finished.

All concrete silos and even the secondary crusher building were built by the slip-form method, which saved skilled labor as well as time. The 100-ton mills and kiln sections were placed with two, 100-ton cranes. Because they were so large, kiln sections had to be brought in over water to Monroe. From there they were transported with floats to the plant site. Routing had to be specially prepared to avoid underpasses and to arrange for lifting of wires.

Erection of the mills was scheduled together with the structural steel, as the roof could only be placed after the mill was installed. By the end of September 1959 all buildings were enclosed. By Dec. 29, 1959, we were making cement—about 550 days after ground was broken. END

MAJOR EQUIPMENT REFERENCE

| | |
|---|---|
| **CLAY SLIP PREPARATION: 300 tph.** | |
| Clay breaker, Bulldog Non Clog 48-in. | Hammermills, Inc. |
| Log washer, 4-log x 35 ft. | Eagle Iron Works |
| Rod mill, 9 x 15 ft., 500 hp. | Mine & Smelter Supply Co. |
| Ball mill, 10 x 10 ft., 800 hp. | Mine & Smelter Supply Co. |
| **CRUSHING: 720 tph.** | |
| Crusher, 42-in. gyratory, 250 hp. | Traylor Eng. & Mfg. Co. |
| Crusher, 24 x 70-in. impactor, 800 hp. (2) | Hammermills, Inc. |
| Screens, 5 x 12 ft. (2) | Nordberg Mfg. Co. |
| Belt conveyors | Link-Belt Co. |
| **SLURRY PREPARATION: 250 tph.** | |
| Grinding mills, 12 x 36-ft., (2) | Nordberg Mfg. Co. |
| Agitators, 120 x 35 ft., (3) | Dorr-Oliver, Inc. |
| **BURNING: 140 tph.** | |
| Kilns, 15/16½-ft. x 460 ft. (2) | F. L. Smidth & Co. |
| Horizontal coolers, 10 x 60 ft. (2) | Fuller Co. |
| Coal mills, (2) | Combustion Eng. Inc., Raymond Div. |
| Clinker crusher, 18 x 60 in., (1) | Hammermills, Inc. |
| Clinker feeder, wobbler feeder 36-in., (1) | Hammermills, Inc. |
| Clinker elevators (4) | Chain Belt Co. |
| Apron conveyors (2) | Chain Belt Co. |
| Coal elevators (2) | Chain Belt Co. |
| Dust elevators (2) | Chain Belt Co. |
| **CEMENT MILLS: 225 tph.** | |
| Tube mills, 12 x 36 ft. (3) | Nordberg Mfg. Co. |
| Bucket elevators, (3) | Chain Belt Co. |
| Air-gravity conveyor | Fuller Co. |
| Air separators, 16 ft. (6) | Sturtevant Mill Co. |
| Feeders, Waytrol, 30 x 42 in., (3); 12 x 30 in., (3); 24 x 48 in., (1) | Jeffrey Mfg. Co. |
| **PACKING PLANT:** | |
| Rotary feeders, 18 in. (30) | Sprout, Waldron Co. |
| Bag filling machines, 4 tube, (3) | St. Regis Paper Co. |
| Motor truck scales, 80 ton, 10 x 100 ft., (4) | Buffalo Scale Co. |
| Rail truck scales, 75 ton, (2) | Buffalo Scale Co. |
| Motor truck scale, 60 ton, 10 x 150 ft., (1) | Fairbanks Morse & Co. |
| Rail track scale, 150 ton, 10 x 150 ft., (1) | Fairbanks Morse & Co. |
| Air conveyors, ceramic plate (12) | Kennedy Van Saun Mfg. & Eng. Corp. |
| **DUST COLLECTING EQUIPMENT:** | |
| Crushing: Bag filter | Northern Blower Co. |
| Burning: Bag filters for dust circulation (2) | Northern Blower Co. |
| Bag filter for clinker crushing (1) | Northern Blower Co. |
| Bag filter clinker transport (1) | Northern Blower Co. |
| Grinding: Bag filters for air separators (3) | Northern Blower Co. |
| Bag filters for mill (3) | Northern Blower Co. |
| Electrostatic precipitators (2) | Buell Engineering Co. Inc. |
| Multiclones cooler exhaust (2) | Western Precipitation Corp. |
| **ELECTRICAL EQUIPMENT:** | |
| Switchgear | General Electric Co. |
| Motor control centers (12) | General Electric Co. |
| Mill motors, 2,500 hp. 4,600 v., (5) | General Electric Co. |
| Induction motors (250) | General Electric Co. |
| Variable speed motor, 250 hp., (6); 200 hp., (2) | Brown Boveri Corp. |
| Instruments | Leeds & Northrup Co. |
| Major contractors | Darin & Armstrong, Inc.; Narland Electric Co.; Nicholson Co. Inc.; F. H. Taylor Co. |



# PCA's ten years of progress in research

by Joseph N. Bell

ON JUNE 7, 1960, the Portland Cement Association research and development center in Skokie, Ill., will celebrate its tenth birthday. The event will be observed quietly; there is more important work afoot at Skokie than birthday celebrations.

Ten years ago at the dedication ceremonies, the PCA laboratory was billed as the "world's largest laboratory dedicated exclusively to research in cement and concrete." Today, that statement can be underscored as a result of the tremendous growth of the past decade.

There have been 22 acres of land added to the original tract of 15 acres. Two major laboratory buildings—constructed in the past few years—have added more than 50,000 sq. ft. of floor space. At the time of the dedication, about 80 people were employed at the laboratories; now it takes more than 200 to carry out the expanded PCA research and development program.

The investigations of the PCA laboratories cover the complete scientific and technical range: from ultimate molecular structure of a grain of portland cement, to the massive engineering characteristics of great dams. Every possible problem concerning the nature and uses of cements and concretes interests the research scientists at Skokie.

There is only one permanent way to insure the future of the rock industries: by constant progress, aimed always at better, more economical products. The men and women who make up the PCA laboratories are single-mindedly dedicated to this end. In the pursuit of it, they sometimes wander up strange paths—strange, at least, to non-scientists who stress "practicality." But this is the age-old conflict between research and sales, practicality and imagination, specific investigation and wide-ranging curiosity.

"The merchandiser doesn't dare to make a mistake," points out Dr. A. Allan Bates, dynamic vice president in charge of PCA research and development, "but the research man who doesn't make 'mistakes' isn't doing his job."

From the mistakes and triumphs of ten years of research and development work at the PCA Skokie Laboratories has come an unquestioned record of profound accomplishment of importance to all of the rock industries.

On the pages to follow, we will look at some of these accomplishments and the people and facilities responsible for bringing them about.

*Please turn page*

FROM LEFT TO RIGHT: Hubert Woods, director of research; Dr. A. Allan Bates, vice president in charge of the laboratories, and Douglas McHenry, director of development, talk over a problem in Dr. Bates' office

EIVIND HOGNESTAD, director of the structural development section, observes a prestressed concrete beam subjected to severe and repetitive vibration in PCA's new structural development laboratory

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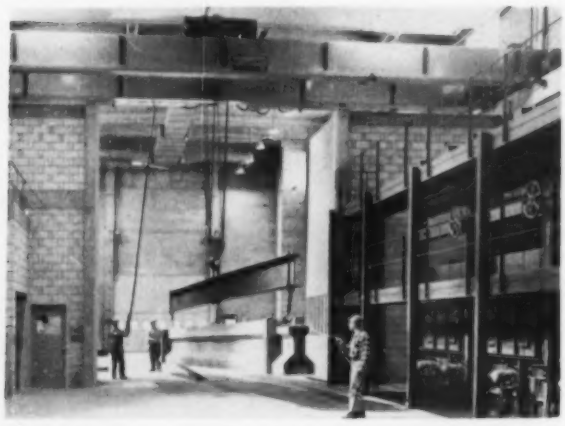


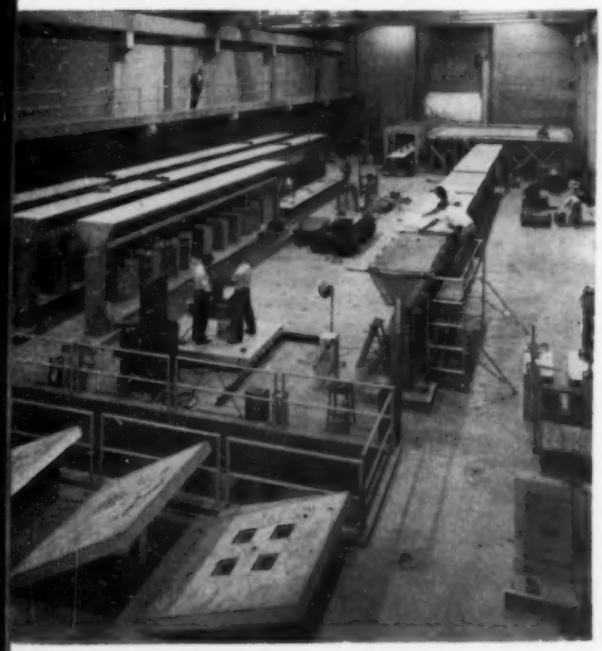
THIS 40-ft. prestressed concrete structural member (cast in the room in the background) is headed for the beam furnace, right, in the new PCA fire research center. Here it will be subjected to both severe heat and loading

# Growth of lab facilities precedes industry's growth

DURING THE PAST DECADE, everything about the cement industry was growing—its capacity, production, sales and, most important of all, the uses for portland cement. Research doesn't just grow along with an industry—it must grow ahead of it. And that's what has been happening at the PCA laboratories.

The physical growth has been impressive. The structural laboratory building—occupied in March, 1958—filled an urgent need for more information about the burgeoning uses of structural concrete. And just two months after moving into the new structural laboratory, PCA scientists also began operations in the 32,000 sq. ft. of floor space in the fire research laboratory—dedicated to investigating and improving the performance of structural concrete under the most severe fire conditions.

In addition to these two major new laboratory facilities, research and development equipment—ranging from a complete mobile testing laboratory to an electron microscope—has been added steadily throughout the past decade.



SEVERAL RESEARCH PROJECTS are under way simultaneously on the test floor of the new structural development lab. The building, itself, is a laboratory, embodying new concepts of precast frame design. The test area makes use of 150 hydraulic jacks—anchored ingeniously to loading devices through a series of holes in the floor—providing a wide range of stresses for testing structural members

HERE IS A PORTION of PCA's new mobile research laboratory at work. In addition to the loading vehicle shown above, the unit includes a mobile instrumentation laboratory

RIGHT: This aerial view shows the PCA research center at Skokie, Ill. The administration building is in the forefront, flanked by the new structural laboratory at rear left and the fire research center on the extreme right

# How does this work help other rock producers?

ONE OF THE UNIQUE QUALITIES about portland cement," says Dr. A. Allan Bates, head of the PCA laboratories, "is that it brings into equal and indissoluble partnership those who use it and those who produce it. Upon this union of cement producers and users rests the joint responsibility for the final qualities of usefulness, reliability and durability of that most versatile and widely used of all construction materials, portland cement. The Portland Cement Association is dedicated to the furtherance of progress through full understanding between these partners."

Dr. Bates means exactly what he says. While the job of user education and personal assistance is that of technical experts in the Association's promotion division, including field engineers in 33 district offices, its laboratories develop usable information vital to this education process. The laboratories are also open to any member of the rock industries who would like to tour them.

But over and above this eagerness to work closely with other members of the rock industries, the PCA laboratory is making an even more direct contribution: by discovering new and improved applications for portland cement and concrete, it is broadening the markets for concrete and, thereby, helping to build prosperity for everyone connected with the sale or use of portland cement.

At present, new construction accounts for about 11 percent of the gross national product. Dr. Bates predicts that by 1970 this figure will rise to 14 percent—and the ratio of concrete in relation to other building materials will double!

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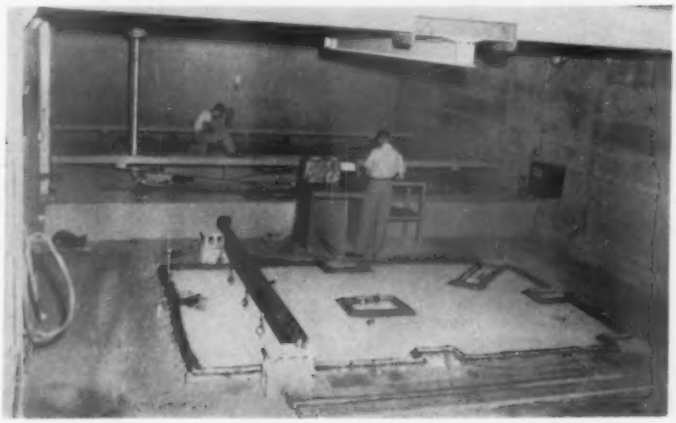
UP TO 3,000 VISITORS—many of them connected in some operational capacity with the rock industries—tour the PCA laboratories each year. Their questions are answered as fully as existing knowledge permits by laboratory scientists and technicians



TWO LABORATORY TECHNICIANS take readings on a test project close to the heart of aggregate producers: the study of concrete pavement sub-bases. This continuing study, aimed at developing maximum efficiency and economy in the design of concrete pavements, is located in a special building at the rear of the PCA laboratory grounds

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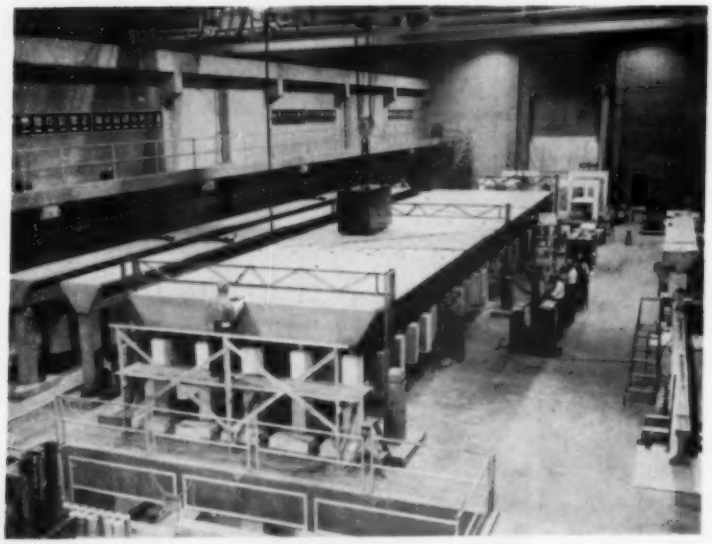
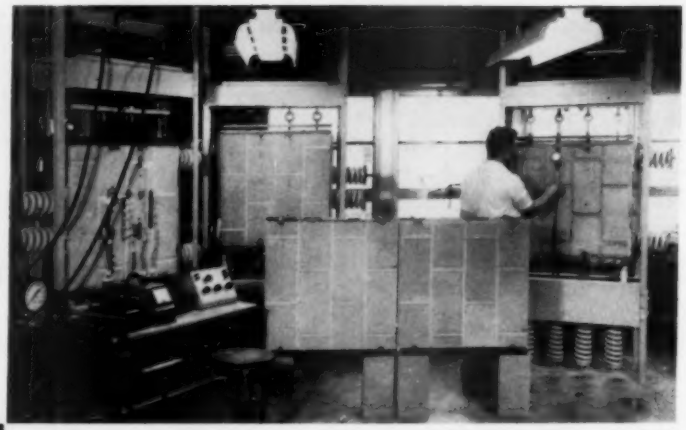
# Here are the major research and development

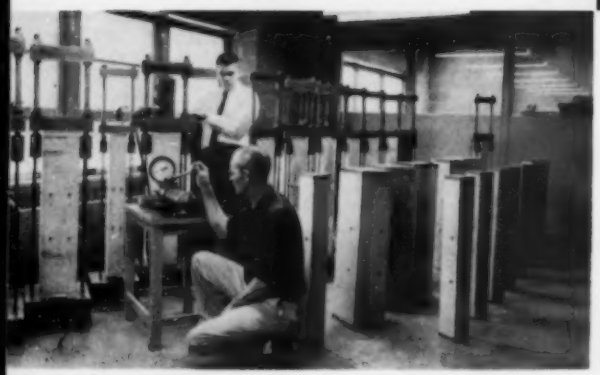


THE GREATEST SINGLE AREA of accomplishment in the past decade has been in the field of structural concrete. The prestressed concrete bridge deck being tested above, in the PCA structural laboratory, is typical of the profound advances in this field. Prestressed concrete has virtually taken over the bridge market in some states and is moving ahead decisively in other structural areas. PCA scientists are in the forefront of this movement. Their development work with high-strength steel and new design concepts to permit maximum economy and effectiveness in concrete structures has led the way in breaking the bonds of conventional concrete structural thinking in North America

BELOW: Extensive tests of concrete highway resurfacing have demonstrated that the performance of resurfaced slabs is about the same as that of monolithic slabs of the same total thickness. The test slabs pictured here (constructed on the PCA laboratory grounds) have yielded much useful data on concrete highway resurfacing



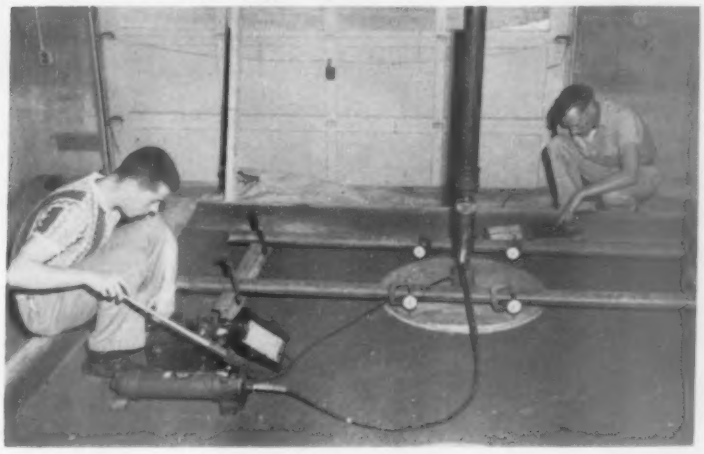
FOR MANY YEARS, one of the abiding problems in concrete block has been shrinkage. During the past decade—in studies like the one pictured above—PCA scientists have separated the two elements of shrinkage: drying and carbonation. Separate investigations are advancing knowledge of the causes of shrinkage and methods of controlling it



THE PAST DECADE has seen a great advancement—through research—in the knowledge of the characteristics of lightweight aggregates and lightweight concrete. Here, PCA lab technicians measure the shrinkage of a series of prestressed structural members to determine the effects of accelerated curing

# accomplishments of the past ten years

WIDE ACCEPTANCE of air-entrained concrete—in which PCA laboratories played an important role—was unquestionably the most important accomplishment in concrete paving in the past decade. The two specimens pictured here offer striking testimony of the advantages of air-entrained vs. non-air-entrained concrete in a climate with severe cycles of freezing and thawing



REPEATED STUDIES, both in the laboratory and field, have provided scientists with a much greater understanding of the type, width and depth of sub-bases required for concrete pavements of maximum strength at minimum cost

RESEARCH WITHOUT COMMUNICATION is of little practical benefit. PCA disseminates its research findings in many ways. One of the most effective is guiding several thousand visitors through the laboratories each year. Visitors are told whatever they want to know. There are no secrets at PCA's laboratories

A NEW MEDIUM for architectural expression in concrete was made possible by development of plastic form liners which permit a wide variety of design, and impart an attractive, glossy surface to the concrete while enhancing the effects of integral coloring materials

*Please turn page*

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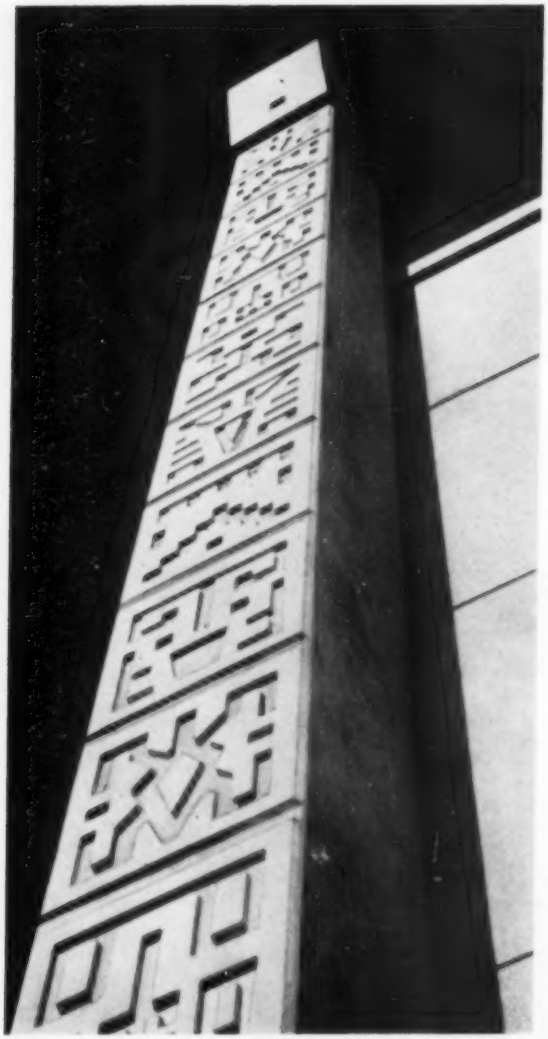


THE AESTHETIC POSSIBILITIES of structural concrete have barely been scratched in this country. The years ahead will see concrete expand not only as a material of great strength and economy, but of beauty as well—as illustrated by this column on the new PCA structural laboratory building

# What's ahead?

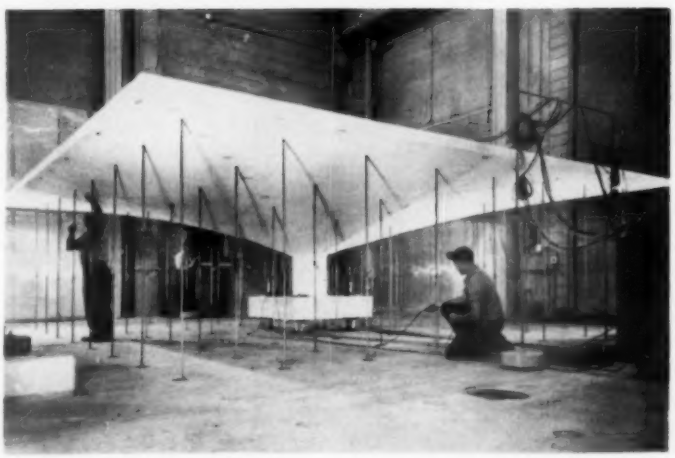
ALL SIGNS INDICATE that portland cement concrete—now almost a hundred years old in North America—is still in swaddling clothes. Spectacular new uses of concrete are in the immediate offing. The impact from some of them is already being felt in the construction industry.

Almost all of the scientists now engaged in cement research look to structural concrete as holding the greatest potential for expansion. Here, a revolution is taking place. Old concepts of massive concrete design are being discarded in favor of new and exciting structutral forms—lighter, stronger, easier to handle, more economical.

Experiments with concrete highway resurfacing and paving sub-base studies to permit thinner, more economical concrete roads should accelerate the use of concrete for paving, too. New bonding practices and shrinkage control will make concrete block steadily more attractive. And so it goes. In virtually every area of construction, concrete shows powerful promise of gaining and growing.

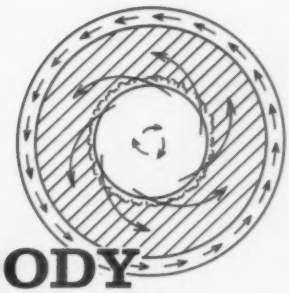
But such changes take time. They require volatile and imaginative thinking among designers and engineers, modified building codes and understanding handling of the material by the people who actually produce and use it. These changes are not come by easily.

Portland Cement Association scientists—using information and developments principally brought to light in their own laboratories—have been in the forefront of this movement for the past ten years. There is every expectation they will be holding the same position in the decade ahead, as well. **END**



NEW AND EXCITING architectural concrete design forms—similar to this thin-shell roof model—are frequently being tested in the PCA laboratories. This is truly the shape of things to come in concrete

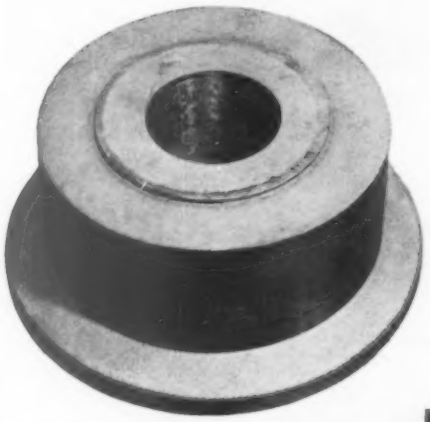
**CEMENT VALVES** used in routing dry processed cement in closed conveyor systems wear rapidly in the seating areas. A typical plant rebuilt cut-outs with hard bronze and re-machined for approximately $250.00 each. Valves usually lasted another 60 to 90 days. Centrifugally cast seats of Stoody 1 inserted in the valve body cost less than $200.00 per set, last several years! These Stoody 1 valve seats are carried in stock in various sizes.



# STOODY CENTRIFUGAL CASTINGS

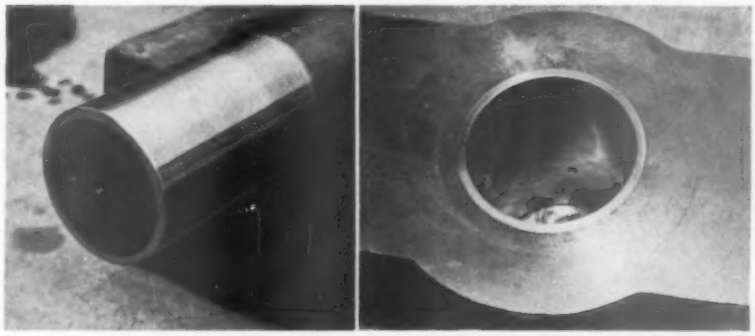
## *for cement plant wear problems!*

**For over 35 years Stoody Company has actively fought wear in industrial equipment with specialized hard-facing alloys. In recent years much development work has been devoted to *centrifugally casting* many of these same alloys as long-wearing replacement parts. For suitable applications, results are phenomenal. The centrifugal process produces an extremely dense, fine grained casting free from porosity and defects found in ordinary castings. Finish machining insures tolerances impossible to achieve with weld deposits. *Although more costly than conventional parts, economy of centrifugal castings far exceeds that of standard parts, with down-time reduced to a minimum!***



**CONVEYOR WHEELS** of hardened steel measuring 4" diameter, wore to destruction in six weeks. Centrifugally cast from WB5, a Stoody alloy, similar wheels have been in use for 7 years.

*A very complete, descriptive catalog featuring Stoody CENTRIFUGAL CASTINGS is available, showing typical uses in cement and other industries. Write for your copy or ask your Stoody Dealer (check the "Yellow Pages" of your phone book).*



**JOURNALS & BEARINGS** — No appreciable wear was found after 15 months service in this Stoody 6 journal and bearing from the bottom spool of a bucket elevator. As photographed, they had already outlasted 4 roller bearing installations.

**STOODY COMPANY**

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Steel wheels specified. Dual pneumatic tires standard.

**LIMA AUSTIN-WESTERN**

# Crushes old concrete to aggregate subbase

"We crush old concrete into 2½-in. aggregate for a subbase on asphalt and stone parking areas. Our portable Lima Austin-Western 2036 primary jaw crusher turns out a high daily tonnage with an absolute minimum of maintenance. We also have a Lima A-W apron feeder on another plant. The feeder has doubled production.

"Based on our experience with the crusher, feeder, and an Austin-Western grader, I'd say that the Baldwin-Lima-Hamilton Corporation turns out quality products which hold up longer and do better jobs than most competitive equipment."—*George H. Souter, Gargaro & Souter, Inc., Detroit.*

Lima Austin-Western offers a complete line of top quality crushing, screening and washing equipment. The finest materials, skilled workmanship, simplicity of design, and engineering experience are reflected in performance records. Depend on Lima Austin-Westerns for accurately sized gravel in quantity and years of trouble-free service. Choice of compact, self-contained portable units or custom-engineered stationary installations. Both types assure you high-speed operation and lower tonnage costs. Ask a Lima A-W owner. See your nearest Lima Austin-Western distributor for facts and figures. Or write to Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

**LIMA AUSTIN-WESTERN** Crushing, Screening and Washing Equipment

BALDWIN · LIMA · HAMILTON

CONSTRUCTION EQUIPMENT DIVISION • LIMA, OHIO

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# Limas charge batching plants for 120 different concrete mixes...

"We use four Lima Type 34 Clamshells to charge concrete batching plants. It takes dependable high-output machines like the Limas to keep pace with the production of our modern concrete mixing operation. Our eight plants can produce 4000 yd. of concrete per 8-hour day. Seventy-seven radio controlled mixer trucks deliver customers a choice of 120 different mixes!

"Maintenance costs are very low—less than 4% of the purchase price of the machines"—*Harold H. Winterrowd, plant superintendent, Anderson Concrete Corp., Columbus, Ohio.*

For heavy duty rock digging, handling bulk materials, or whatever the job, there is a Lima best suited to the application. Shovels to 8-yd., draglines variable, 2 and 5-yd. front loaders, and cranes to 140 tons on crawlers, 75 tons on rubber.

For reliable high production with low operating and maintenance expenses, you just can't beat Limas! That's because they are better designed and better built of better materials. In a word, Limas are *better* all around than competitive machines. And we can prove this to your satisfaction. For facts and figures, see your nearby Lima distributor or write construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

Lima Type 34 Crawler Mounted Clamshell, one of four LIMAS that help keep the 77 radio-controlled mixer trucks on the move.

## LIMA LOADERS

Now available in two different capacities, 2 and 5-cu. yd., Lima Loaders have been designed to give top loader production with shovel efficiency.

Lima Loaders are ideally suited for handling gravel, stone, coal, dirt, chemicals or other bulk materials. With these versatile machines you can dig, scoop, swing and load in a complete circle at full speed from a stationary position; work in restricted areas without waste motion.

Lima Loaders are fully convertible in the field for shovel, crane, dragline or pull-shovel operation.

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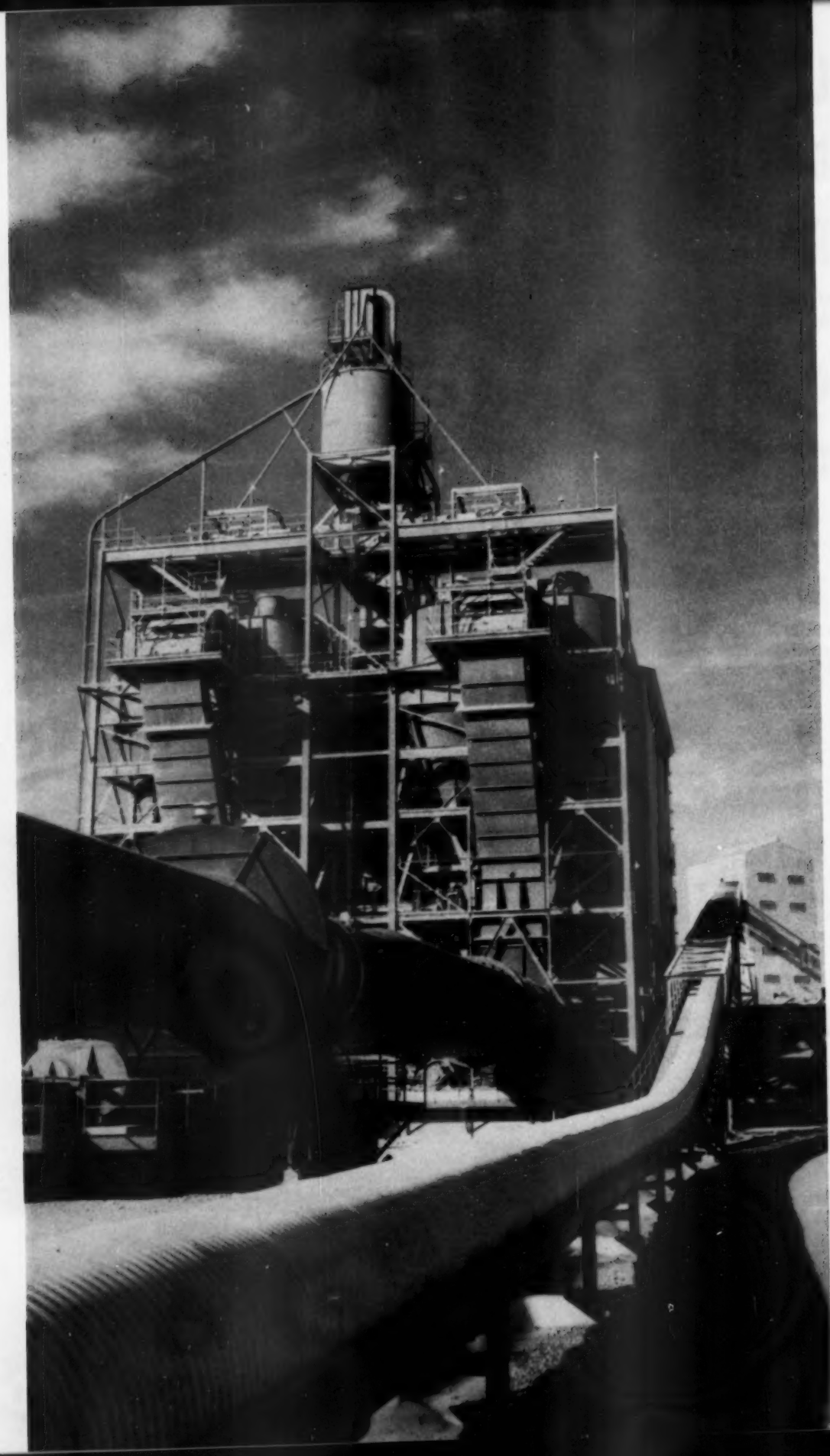
Shovels • Cranes • Draglines • Pullshovels • Roadpackers • Crushing, Screening and Washing Equipment



*New plant rises out of the desert to provide vital cement for Arizona's mammoth construction project*

# Glen Canyon Dam spawns Phoenix Cement

by Elwood Meschter

CONCRETE FOR HIGH-RISE DAMS calls for high-quality cement. And Phoenix Cement Co., a division of American Cement Corp., built its new 1.8-million-bbl., dry-process cement plant at Clarkdale, Ariz., just for this purpose. Even before the $18-million installation was built, the company had an order in hand to provide cement to build the giant Glen Canyon Dam.

More than 3 million bbl. of Type II cement will be shipped to the site of the mammoth structure over a four-year period. While the dam will average about 900,000 bbl. a year, peak shipments will reach 160,000 bbl. a month—virtually 100 percent of production.

The new cement plant was designed to assure cement uniformity, yet to provide it economically and efficiently. Uniformity was achieved in these ways:

- Raw materials are weighed and sampled as they go to storage.
- Mill-fed raw materials are thoroughly blended by the action of stocking out and reclaiming.
- Clinker is sampled as it goes to storage.
- Stocking out and reclaim system for clinker thoroughly blends cement before it goes to shipping silos.

Of course, the excellent supply of raw materials in the Clarkdale area make the blending process that much simpler. Limestone comes from two sources. One is Redwall, a rust-colored, heavily fractured, high-calcium limestone which gets its distinctive color from the eroded sandstone which has penetrated the brecciated formation. The other is Lakebed—a banded chalk separated by sedimentary deposits. This formation bears the alumina and silica needed for cement making.

Iron is taken from the mountains of copper-

*Please turn to page 118*

RIGHT: A small wagon drill puts down blast holes in an outcrop of high-calcium Redwall limestone

LEFT: Double-cyclone preheaters high above the feed end of the two big kilns dominate the new cement plant. A small steel bin at the top feeds raw feed into the stream of kiln exhaust air

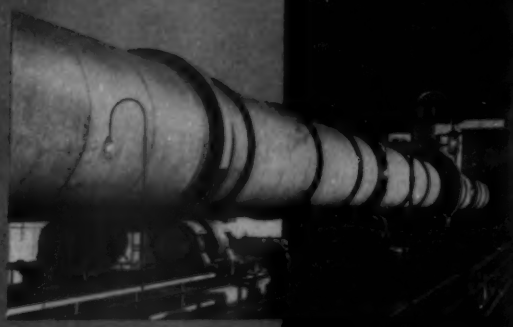
# KENN

## FOR IMPROVED CAPACITY,

### KENNEDY STONE PREPARATION MACHINERY

Jaw crushers—Blake and Overhead Eccentric types —impact breakers, primary and secondary gyratory crushers, screens and conveyors — each noted for its dependability—can be integrated for the balanced output of correctly graded stone sizes.

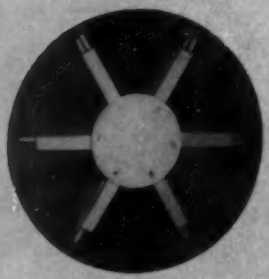
### KENNEDY ROTARY KILNS



New standards of kiln performance and economy derive from KENNEDY's new, exclusive digital computer analysis of rotary kiln processes, and from KENNEDY's many years of experience in designing and manufacturing kilns for the cement industry.

### KENNEDY INTERNAL HEAT RECUPERATOR

The "MULTIVANE" design of alloy steel vanes provides maximum transfer of heat and movement of material. The result is substantial saving in fuel—as high as 15%! Can be supplied for installation in existing kilns with a minimum of downtime.



# KENNEDY

## CEMENT PLANT MACHINERY

## ECONOMY, PERFORMANCE

### KENNEDY GRINDING MILLS

KENNEDY mills are distinguished for high capacity, dependable performance, low operating cost and minimum maintenance. Used for grinding raw material (wet or dry) and clinker and pulverizing coal for firing rotary kilns.

### KENNEDY PNEUMATIC CONVEYING SYSTEMS

**THE AIR-GRAVITY CONVEYOR**

The exclusive porous tile conveying surface makes Air-Float the preferred, proven method for moving dry, pulverulent materials horizontally.

**KENNEDY PNEUMATIC PUMPS**

convey more material through smaller pipelines. There are no motors, no feed screws nor other moving parts while conveying.

### KENNEDY CENTRALIZED EQUIPMENT CONTROL

Control Cubicle for Rotary Kiln and Auxiliaries

All instruments essential to the system control are housed in a single, attractive cubicle, panel or console. Each is factory-assembled and checked to simplify installation and insure efficient overall operation.

Panel and Console for Centralized Control of Raw and Finish Grinding Operation

KENNEDY cement plant equipment has won an enviable reputation for improving the capacity, economy and overall performance of cement plants all over the world.

This accomplishment is no accident!

KENNEDY knows cement! KENNEDY's staff of cement specialists has a long record of successes in designing and building equipment for cement plants. The KENNEDY manufacturing plant is the most complete of its kind enabling production of machinery of the highest quality.

KENNEDY's position as a leader in this field is easily demonstrated. We welcome your request for specific examples of KENNEDY's successful installations.

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## GLEN CANYON DAM SPAWNS PHOENIX CEMENT

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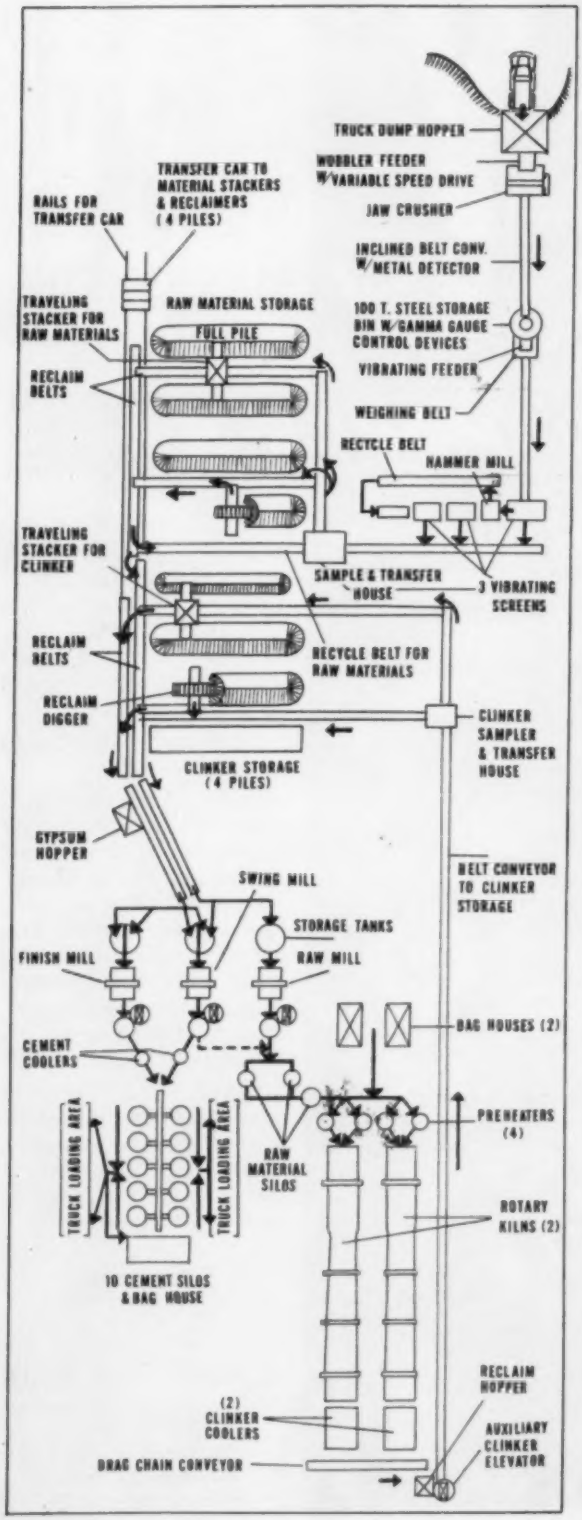



smelter slag near Clarkdale, while raw gypsum is brought from Camp Verde, only a few miles down the valley.

The two limestone deposits are quarried alternately to maintain a ratio of about 20 percent Lakebed to 80 percent Redwall stone going to the bedded storage system. Since the two quarries are several miles apart, the big drill rig is truck-mounted to shuttle back and forth between them. This is a rotary drill with its own compressor mounted on the truck body. Best drilling results so far have been achieved using a 6-in. diam. down-hole hammer drill. The Redwall quarry has an auxiliary crawler-mounted drill to put down 2½-in. holes in places that can't be reached with the truck.

Electric shovels load out a fleet of five 25-ton, end-dump trucks. The easy-digging Lakebed is loaded out with a 2½-cu. yd. unit; Redwall is handled with a 4½-cu. yd. shovel assisted by a 2½-cu. yd. diesel unit.

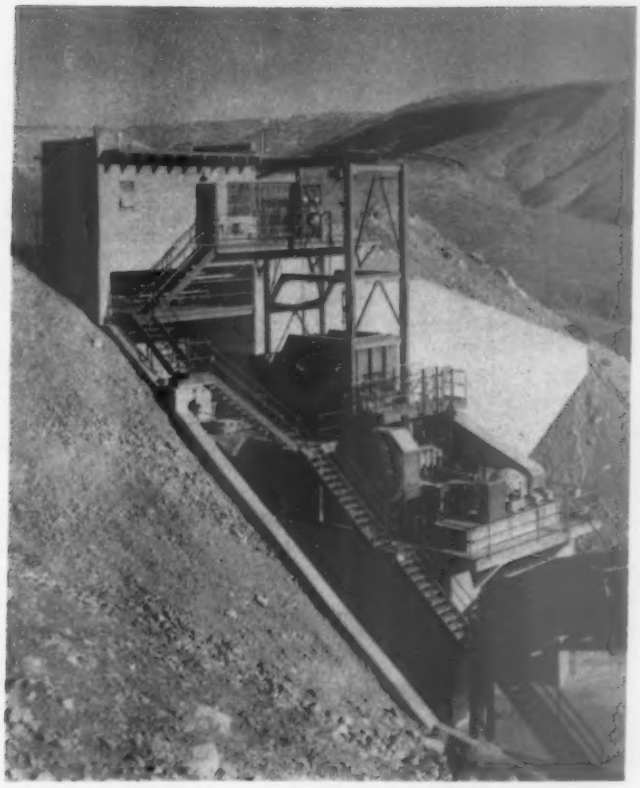
Both quarries are in the hills high above the cement plant which is already at an elevation of 3,800 ft. The roads are downhill almost all the way to the primary crusher hopper. As a safety measure all down traffic is routed to stay on the side of the road next to the hill. This means left-hand, English-style traffic on the Redwall road, but it means a greater degree of safety since trucks would not have to cross the stream of traffic to reach runaway ramps cut into the hillside. These ramps let trucks pull off the steeply pitched roadway in event of brake failure.

Primary crusher is a big 60 x 48-in. jaw crusher fed with a 5-ft.-wide wobbler feeder. This unit scalps off plus 3-in. rock for the crusher, letting the fines drop through to the foot end of the belt conveyor below. A bed of fines that builds up on the belt protects it from the impact of minus 6-in. crushed rock dropping out of the crusher. Smelter slag is also put through the feeder and into storage with the rock.

**All raw materials — slag or limestone** — are weighed before they are sent to storage. A 100-ton steel bin holds material above a weighing system which records and controls the flow of raw material going to storage. Rock or slag is metered out by a heavy-duty vibrating feeder to a weighing belt feeder at a rate set by an operator. This rate is usually in the 350-tph. range, but it could easily be doubled if the system were expanded in the future.

The three nuclear devices that control the flow

THE SECONDARY SCREENING TOWER is tooled with three vibrating screens and a hammermill. Plenty of space has been allowed for expansion



THE BIG PRIMARY JAW CRUSHER is fed with a wobbler feeder. A metal detector on the conveyor signals the alarm when it senses tramp iron

TRAVELING STACKER automatically builds 300-ft. long piles of raw materials or clinker ready to be reclaimed for the mills

of materials through the surge bin are as modern as tomorrow. Here's how they are set up to maintain a head of material over the weighing feeder with a minimum of attention from an operator. One instrument at the bottom projects a stream of radiation from a cesium 137 source through the width of the bin. As long as the material adsorbs the radiation and prevents the sensing device from receiving the full blast, the feeding circuit remains closed and operating. But as the level of the material falls below this point, an alarm is sounded and the feeder stops.

Two devices at the top of the bin operate in a similar manner. The lower of the two starts and stops the wobbler feeder feeding the jaw crusher, thereby maintaining a level of material in the surge bin. If this device does not stop the wobbler feeder and the material builds up to the level of the third device, an alarm is sounded and the wobbler is manually shut down. *Please turn page*

## GLEN CANYON DAM SPAWNS PHOENIX CEMENT

*continued from page 119*

The measured weight of raw material moves to the top of a screening tower where plus ¾-in. rock is dropped to a secondary hammermill. All fines through this double-deck vibrating screen are put on an inclined belt conveyor for the trip to the sampling tower. Crushed fines are recycled to the top of the screen tower where a pair of double-deck vibrating screens in series take out fines. These screens are in series to assure maximum screening efficiency when handling surges and to provide ample screen capacity for an expanded materials handling system.

The plant chemist uses the sampling system with the weighing system to determine "how much" of "what kind" of raw material is going to storage. With these figures, there is little concern about fluctuations in analysis. The bedding and reclaim system together produce a thoroughly mixed raw material for the milling department.

With three kinds of raw materials to work with, it is a simple matter to put more of any one of them into storage to balance the analysis. A recycling system has been added to the raw materials reclaim system as a standby measure. In this way, materials in one pile can be thoroughly remixed as they are transferred to another storage pile.

**Stocking out makes the first blend of raw materials.** Belt conveyors deliver the minus ¾-in. crushed materials to a traveling stacker. This unit slowly moves back and forth the 300-ft. length of the storage area. When the pile is completed it is about 90 ft. wide at the base, about 40 ft. high and holds about 20,000 tons of raw materials.

One stacker can make two piles on each of the two areas it travels. Ordinarily it makes one pile at a time by using only one of its two stacking booms. These booms are lowered close to the pile to avoid wind-blown material. A feeler gauge at the end of each boom senses when the bottom of the conveyor is too close to the top of the pile and raises the boom automatically. When the pile is full and the boom cannot be raised, a time-delay relay stops the conveyor system.

Four piles of raw material are now adequate for the milling capacity of the new plant. But new storage piles can be made readily by expanding the storage area and by extending the rails of the transfer car system.

A transfer car moves the stackers to any one of the four storage stations in each of the raw materials or the clinker storage areas. The transfer car also takes care of the two reclaim machines, moving them from one pile to another.

A traveling digger reclaims raw material. This unit is equipped with a 16-ft. diam. rotary bucket wheel that moves slowly across the width of the pile. This bucket mixes material thoroughly as it digs the full triangular cross section of the pile and discharges the material to a cross conveyor. This conveyor leads to a belt conveyor system running the full length of the storage area to the mill building.

Clinker is handled in much the same way. It is stocked out with an identical stacker and reclaimed with a traveling digger. A parallel belt conveyor system takes clinker to the milling department. The clinker belt also puts raw gypsum, which it receives from a truck hopper, into the system.

The mill department was arranged to take advantage of the great flexibility provided by the two storage systems. One of the three 12 x 19-ft. single-compartment ball mills makes kiln feed, while another makes only finished cement. The third unit is a swing mill, equipped to handle either raw materials or clinker. When cement hauling to Glen Canyon is at a peak, the two mills can team

*Please turn to page 124*

SPECTACULAR northern Arizona desert scenery and the ghost mining town of Jerome dominate the new cement plant built to supply vital raw material for Glen Canyon Dam



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# "The No. 977 is in a class by itself...

***Outproduces our other shovels 3 to 1—does a variety of jobs—shows no wear, after more than 1000 hours."***

**Osby Storey, Livingston Limestone Co., Livingston, Tenn.**

A No. 977 Traxcavator is the "backbone" of this quarry operation. It strips overburden—sandrock 6 to 10 feet deep—with the bucket pry out action making the job easy. It loads blasted rock for a crusher. It loads and stockpiles crushed rock and agricultural lime—fills a 5 cu. yd. hauling unit in 45 seconds. Owner reports that the heavy-duty track roller frame is just what's needed for working in blasted rock.

Versatility . . . speed . . . dependability . . . add up to top performance in a No. 977 Traxcavator. It's loaded with features that can pay off on your job.

Lifetime lubricated rollers need no lubrication until rebuilding . . . eliminate on-the-job shutdowns for servicing. The exclusive Caterpillar oil clutch gives up to 2000 operating hours without adjustment. With hydraulic track adjusters an ordinary grease gun is all that's necessary to properly adjust tracks.

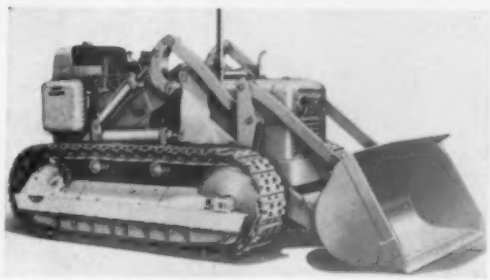
The heavy steel main frame is a welded, one-piece unit. Box construction track roller frame absorbs the loads and stresses of hard work. Lift arms are made to stand up under the strain of heaviest digging conditions.

The No. 977 is fast—easy to operate. A quick-response hydraulic system cuts cycle time—increases maneuverability. Tractor controls are conveniently located for handling ease. Bucket controls at the right armrest are placed for easy operation.

From tracks to lift arms . . . the No. 977 is designed for low cost, top performance. Get the complete facts from your Caterpillar Dealer. He'll arrange a demonstration on *your* job.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

**QUICK CHANGE—SPECIAL BUCKETS FOR THE No. 977 TRAXCAVATOR**



Heavy Material Bucket—for easier penetration of tough materials weighing over 3600 lb. per cu. yd.

Skeleton Rock Bucket—heavy ribbed construction openings for material size selection.

◀ Side Dump Bucket—dumps to left or front. Increases production by eliminating turning to dump.

**CATERPILLAR**

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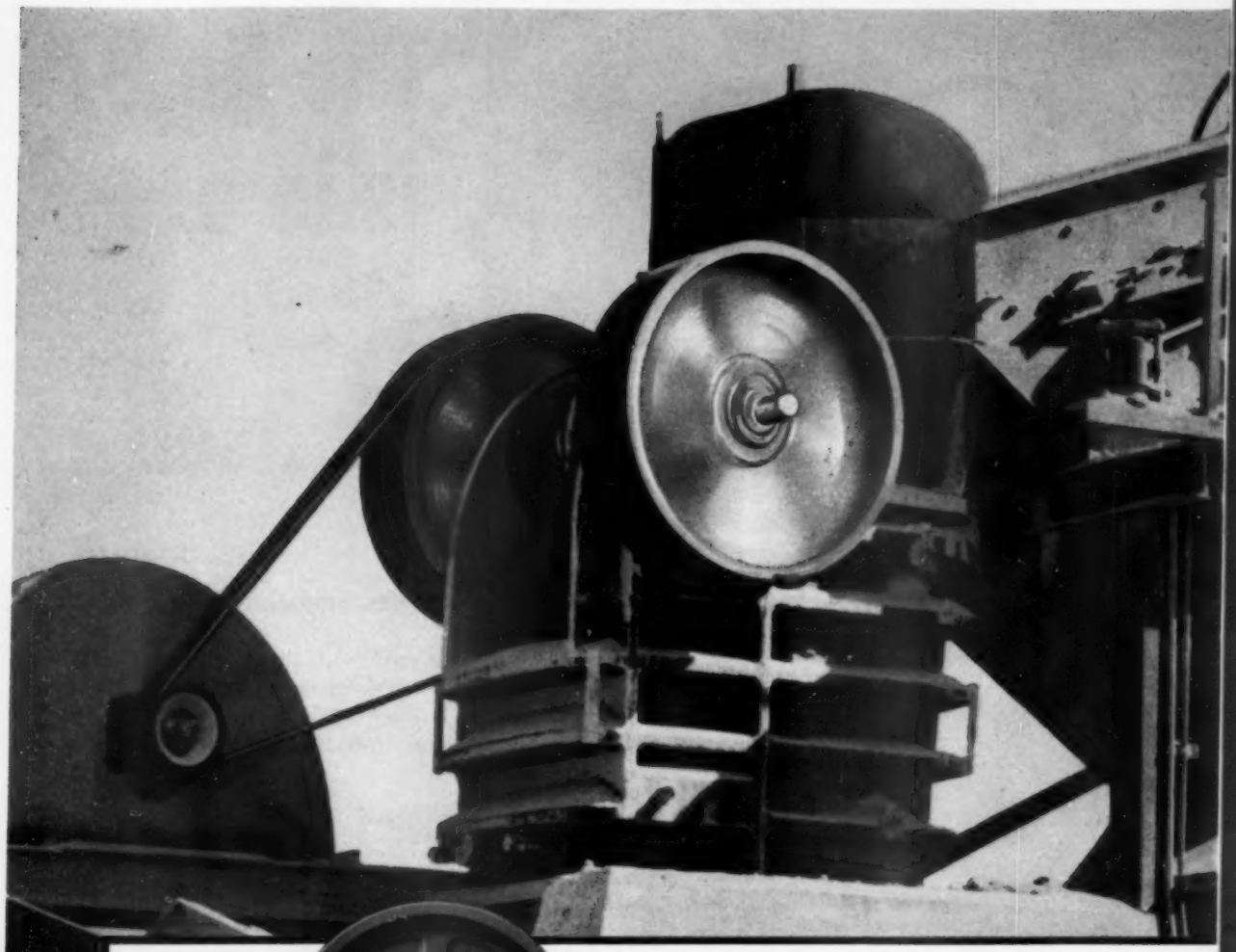
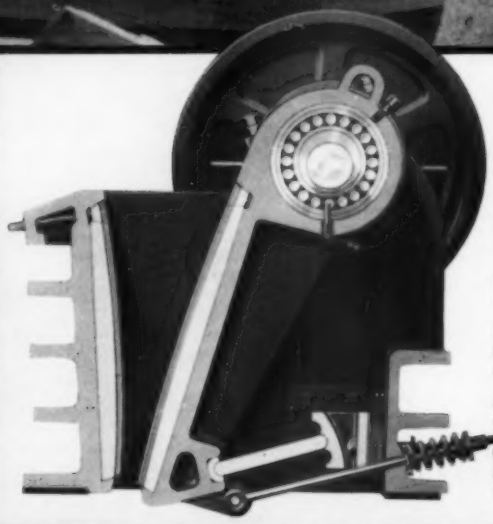
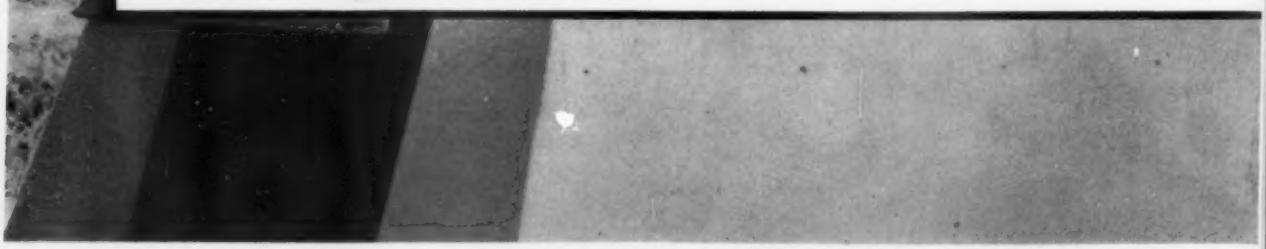
**BOOST PRODUCTION AND LOWER COSTS WITH A VERSATILE TRAXCAVATOR**





| Grizzly-King Advantage | How You Benefit |
|---|---|
| Curved, replaceable jaw dies are up to 37% deeper than other makes. | More crushing area, and better nip angle . . . means higher production at lower cost per ton. |
| Up to 16% greater eccentric throw, made possible by special frame and shaft design. | Greatly increases productivity . . . conserves power. |
| Contoured upper jaw area, with set-back shaft. | Takes larger-size feed, minimizes bridging of slabby rock. |
| Up to 26% larger-dia. alloy shaft, with inner-adjustable radial-thrust tapered roller bearings. | Absorbs heavy shock loads. Bearing clearance can be adjusted in field for better wearing efficiency. |
| More flywheel weight than other crushers (details on request). | More sustained crushing force . . . higher efficiency. |
| Cast-steel frame, with heavy reinforcing ribs. Special frame design for every jaw size. | Reduced vibration and wear for longer productive service. |



# How to figure the true cost of a jaw crusher

The true cost of a crusher extends over the *life of the machine*. Over a normal life-span of 20 years, differences in productivity and cost-per-ton can far outweigh the importance of original price as a cost factor.

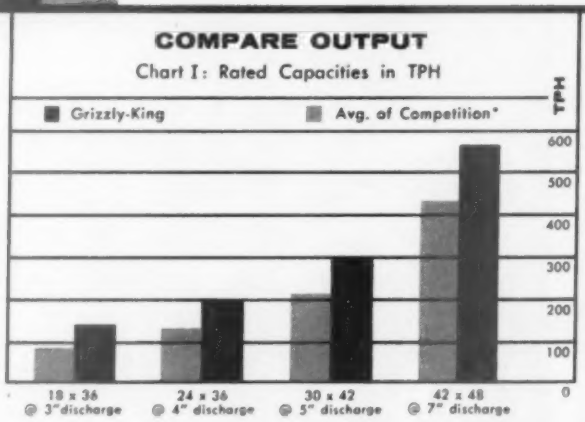
For example, consider the tremendous difference in hourly output among jaw crushers in the same size range. A comparison of manufacturer specs (Chart I below) shows that Grizzly-King is rated 40 to 120 tons per hour higher than the average of other comparable-size makes. You can see what this extra productivity can mean in terms of costs and profits: A "plus" of just 40-tons-per-hour, over a 1200-hour season, figures out to 48,000 additional tons of material per year!

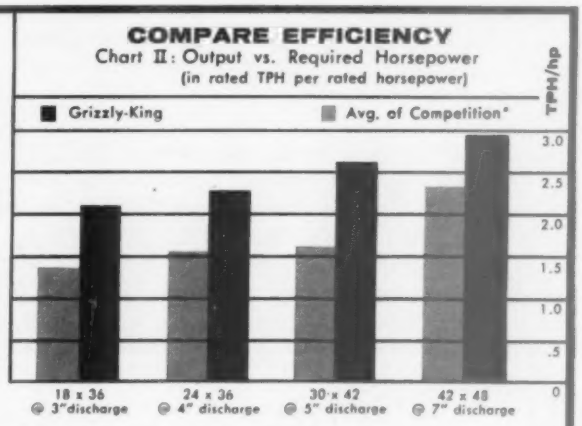
Another item that doesn't show on a crusher's price tag is fuel consumption. Field performance records show that fuel (or electric power) requirements can actually vary as much as 100% between jaw crushers of comparable output. Factors involved are size and weight of flywheel, length and curvature of jaw dies, efficiency of crushing stroke, and overall balance of machine. Chart II puts these variables together . . . shows how Grizzly-King gives you up to 62% more rated tonnage per unit of h.p. required.

No less important are lifetime maintenance costs . . . in parts, labor, and downtime. Take a look at Grizzly-King design advantages on opposite page . . . see how you get more crusher to start with, to save "hidden" costs later on.

Want specific figures to help you arrive at total costs of your next jaw crusher? See your Lippmann distributor or send coupon below.

**LIPPMANN**
**Engineering Works, Inc.**
**Milwaukee 14, Wisconsin**




* Competitive figures above based on latest available specifications of Smith, Universal, Lima, Diamond, Iowa, Pioneer, Rogers, and Gruendler, wherever same or comparable sizes exist, and at equivalent discharge settings. To simplify chart, median figures are used where specifications are given in a minimum-to-maximum range.

*Mail to:*
**LIPPMANN**
**Engineering Works, Inc.**
Milwaukee 14,
Wisconsin

Yes, send details on how I can increase profits with Grizzly-King jaw crushers

NAME ..... TITLE .....
COMPANY .....
ADDRESS .....
CITY ..... STATE .....

F-C-10-59

*Enter 1019 on Reader Card*

## GLEN CANYON DAM SPAWNS PHOENIX CEMENT

*continued from page 120*

up to keep up with shipments. At other times, the swing mill works on kiln feed to let the two big kilns build up the clinker storage piles.

Each of the mills is equipped with weighing belt feeders to draw raw materials out of small compartmented surge bins. The two mills that handle raw materials are equipped with furnaces for drying and to make them semi-air-swept. Air-borne fines are removed in a cyclone, while milled fines are dropped to a bucket elevator. A pair of air separators then removes minus 200 mesh and drops the oversize back to the mill.

**Phoenix Cement's flair for detail** to achieve maximum operating efficiency is shown in the design of the mill building. To assure the most compact arrangement of mills, bins, elevators and conveying equipment, design engineers built a scale model. Scaled pieces of equipment were fitted into the mockup by trial and error. Result—the building and machinery fitted together like pieces of a huge jigsaw puzzle. Another advantage: When more equipment is added it will fit neatly into space already allocated to it.

Air-sweeping each raw mill is another effective detail. Hot air from the furnace dries the raw limestone in the mix. At the same time, it lifts minus 200-mesh material out of the mill as soon as it is down to size and carries it to a cyclone collector which discharges to the elevator feeding the separator. This arrangement helps to reduce overgrinding of materials.

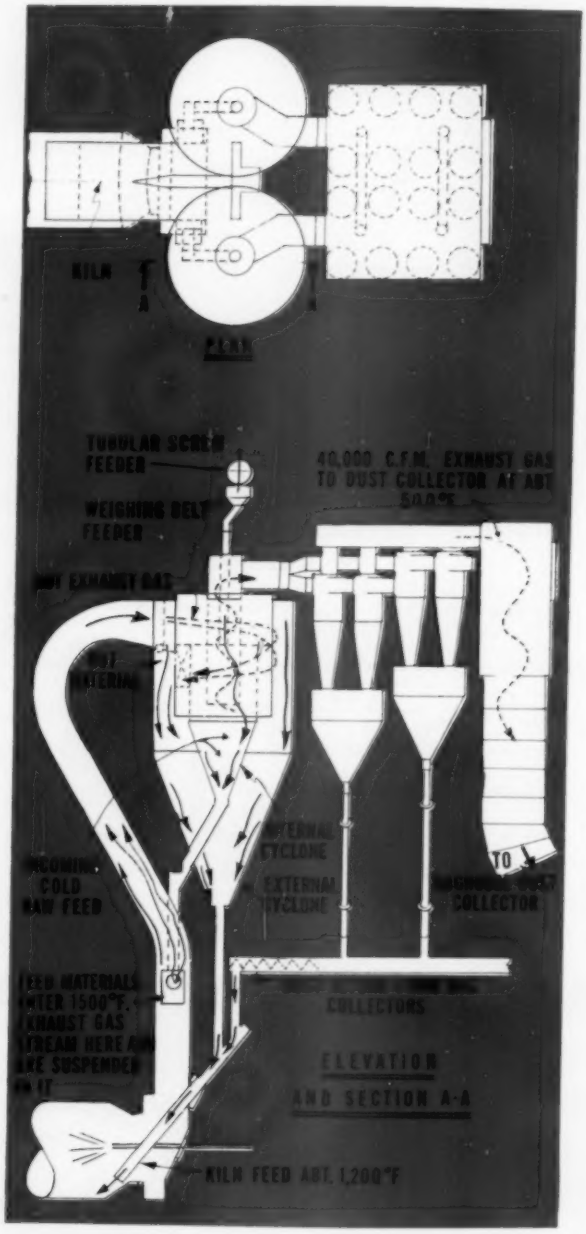
**Design of the three bucket elevators** in the mill building is another refinement developed by the engineers who designd the new plant. Each elevator is housed in a circular casing. This casing gives far greater column strength to support the line of elevator buckets and the machinery at the top than conventional sheet-and-angle, rectangular section elevator casings.

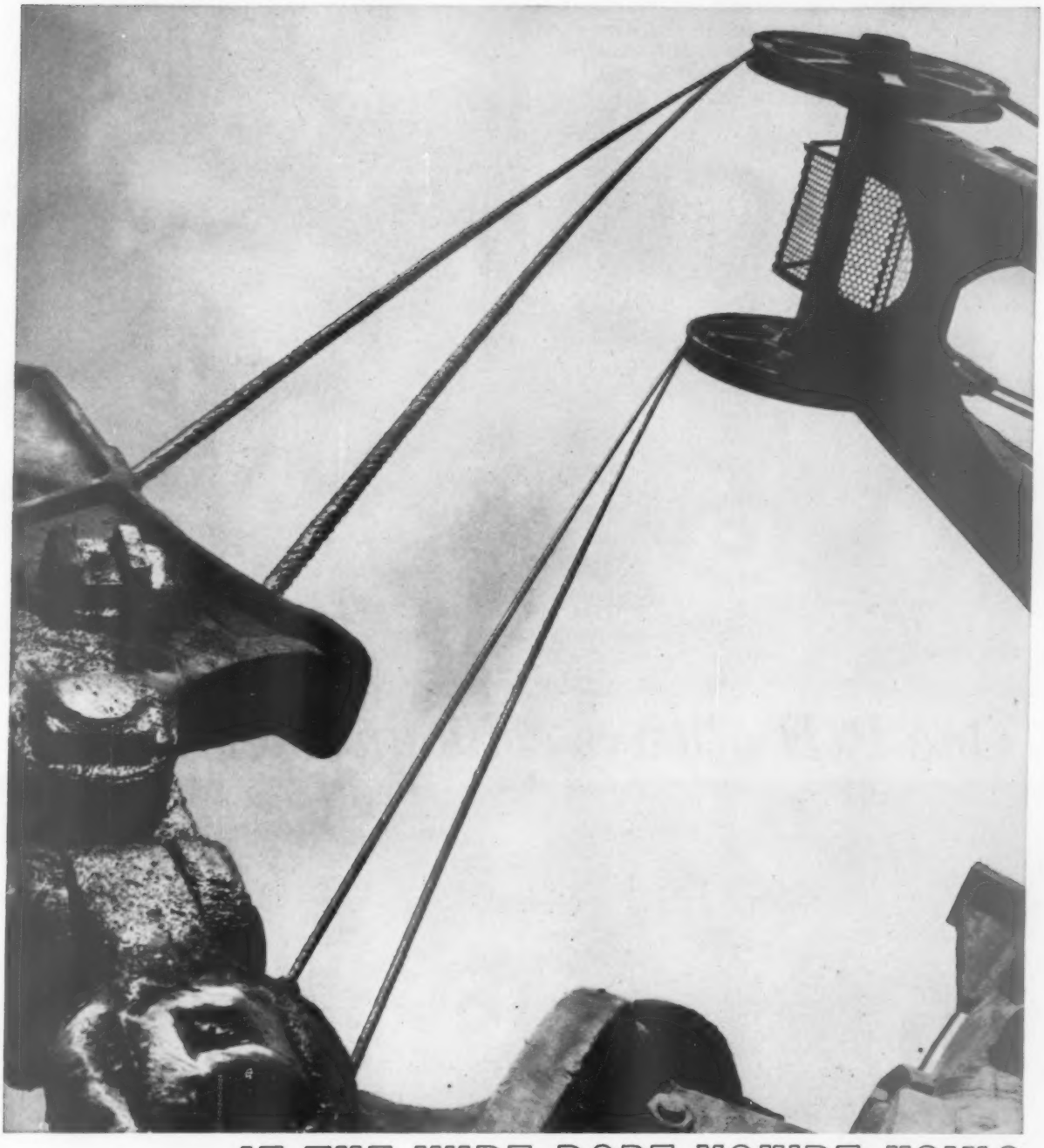
Circular sections were far easier to install and have proved to be exceedingly simple to maintain. Apparently there is little tendency for material to build up in the boot. But when the bottom of the casing must be cleaned, the circular casing allows plenty of working space.

Cement coolers are another essential piece of equipment in the mill building. These coolers are essential when the scorching heat of the Arizona summer would prevent newly milled cement from losing heat by radiation. The water-cooled vertical coolers permit cement of uniform temperature to be sent to storage; but the units can be by-passed whenever the weather permits normal radiation to cool the cement coming out of the separators.

Dust control is another vital part of the mill department. Raw mills and finish mills are vented to bag collectors. One collector takes exhaust air from the cyclones and air separators in the raw material circuit; another from the finish mills. As

*Please turn to page 130*





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This rope has it—and has it at every critical point of wear for these reasons:
**Extra Resistance to Bending Fatigue · Extra High Strength**
**Good Flexibility and Excellent Resistance to · Shock · Abrasion · Impact · Crushing**
For anything you want to know about Roebling Royal Blue Wire Rope, ask your Distributor or Roebling's Wire Rope Division, Trenton 2, N. J.

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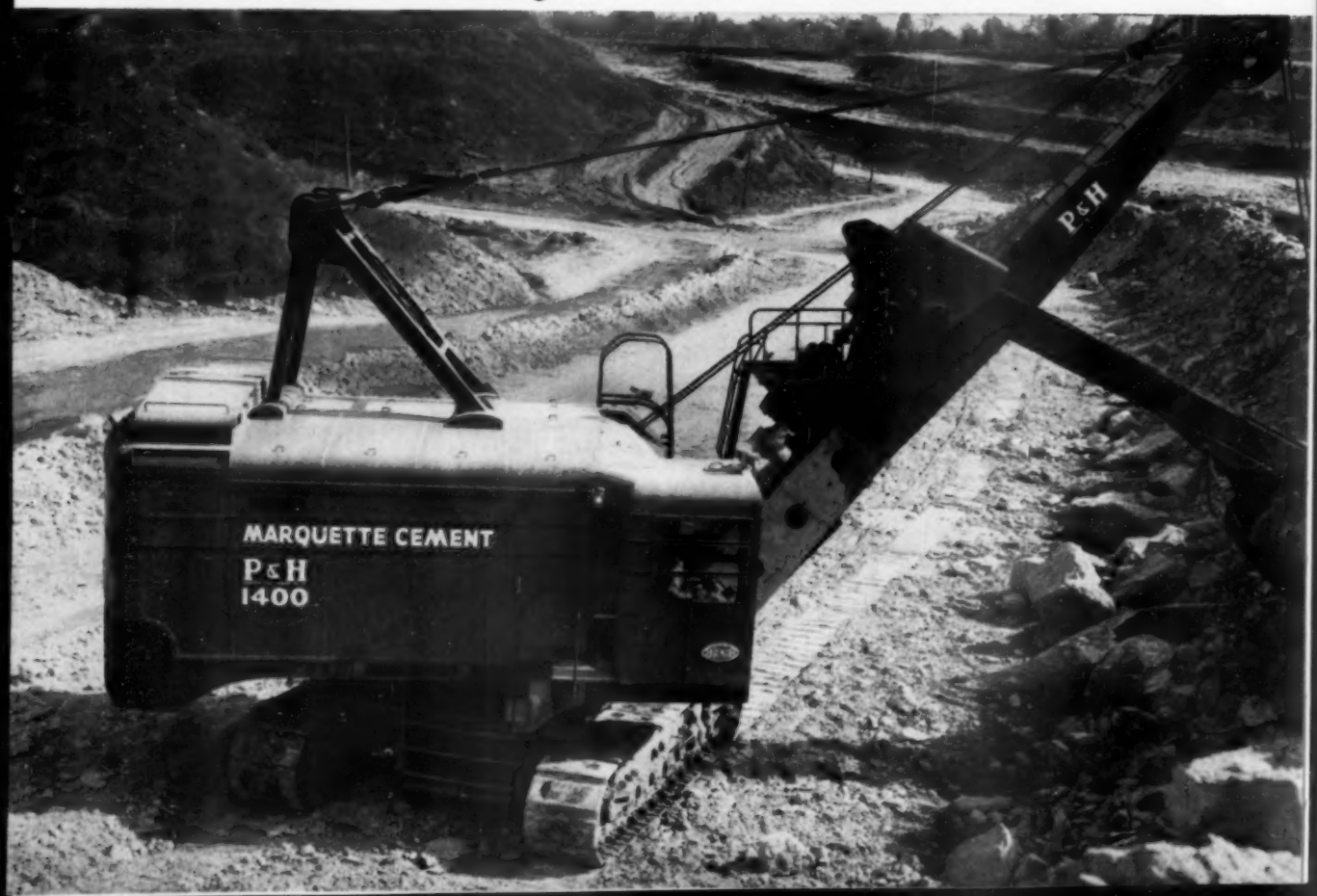
Two 4½ cubic yard P&H Model 1400 Electric Shovels owned by Marquette Cement Manufacturing Company, Chicago, Illinois are shown here loading hard limestone at the Marquette Cement Plant and Limestone Quarries near Oglesby, Illinois.

# *One P&H always sells another...*



# At MARQUETTE CEMENT COMPANY P&H "Profit·Tons" reduce loading costs all day... every day

Up to 10% more production, lower loading cost per ton and more net profit are the reasons why mining operators the world over are standardizing on P&H Electric Shovels. Actual job reports from P&H owners indicate that up to 30% higher bail pull maintains a more uniform dipper speed for faster filling in difficult digging. Also, greater job availability and the exceptional physical strength of P&H welded alloy construction are responsible for this outstanding performance.

P&H "Profit-Tons" are the end product of these exclusive P&H design principles:

MAGNETORQUE® puts more material into the dipper—faster—with every pass! It's the most productive digging motion drive known for electric shovels. This patented P&H drive electro-magnetically transmits the full digging power of an A.C. hoist motor direct to the dipper without motor generator set conversion to D.C. current. It gives higher bail pull, greater dipper fill factor and automatic impact protection to the digging machinery.

ELECTRONIC CONTROL . . . this patented P&H control accomplishes the quickest work motion reaction time known on electric shovels. Control maintenance expense is reduced as much as 80% by elimination of all moving parts for a completely closed circuit system.

In addition, with P&H—and only with P&H—do you get the service assurance of single source responsibility. P&H manufactures their own electrical as well as mechanical components—designed specifically for electric shovel service. Write Dept. 500A, Construction & Mining Division, Harnischfeger Corporation, Milwaukee 46, Wisconsin.

**HARNISCHFEGER**

*Milwaukee 46, Wisconsin*

**P&H**

**P&H LINE:**
Electric Excavators: 3½ through 10 yds.
Diesel Excavators: ½ through 3¼ yds.
Truck Cranes: 10 through 80 tons

P&H equipment is also manufactured in Australia, Brazil, Canada, Germany and Japan.

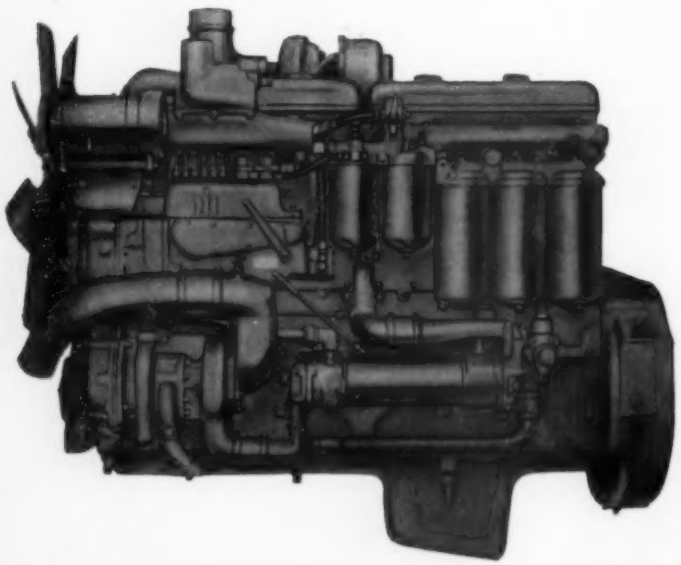
# How BRAWN-BACKED Payscraper® features give you stepped up...loading

**From power plant to push-block,** the 34-cu. yd. International 295 Payscraper gives you an exclusive combination of features that step up dirt-on-fill delivery! Compare quiet, big-capacity DT-817 Payscraper power. Try the advantage of up or down, on-the-go, Payscraper power-shifting that provides load-speeding *automatic* direct-drive lockups in second, third, and fourth gears! Measure *extra value features* like safe, effortless power-steering—that leaves "the steering feel in the steering wheel." Note how exclusive torque-cushioning planetary drive axles add dependability to rough-and-tumble earthmoving! See how 122-inch bowl width speeds loading and unloading—adds control ease and stability, loaded or empty. Prove on your job that bonus performance "rides" the Payscraper bowl. Choose the 2-axle "295"; or 3-axle, 34-cu. yd. "495." See your International Construction Equipment Distributor for a demonstration.

...roading

**Payscraper power-to-payload punch** tops all other rubber-tired rigs—because the fast-slugging, high-torque International DT-817 diesel is the Payscraper power plant! The 375-hp, turbocharged DT-817 gives you direct, push-button starting; all-altitude high-efficiency performance; power for top rim-pull to help speed all steps of the cycle; time-saving "no-lag" control power!

...dirt-on-fill capacity!



**Even "dead" sand comes alive** and "boils" fast into the Payscraper bowl. Every detail of Payscraper design aims at speeding the cycle, and *staying available!* The 21-inch diameter steel cross tube provides super load-bearing strength and resistance to impact. Bowl "backbone," draft arms and side reinforcing members all are massive high-strength box-section steel weldments. "X"-member reinforcing maintains perfect push-frame alignment at all times. And the 4-speed, planetary-type, torque-converter power-shift transmission automatically adjusts torque and load to speed — to maintain full capacity!

**You steer the 140,000-lb.** loaded Payscraper almost as easily as a 3,600-lb. automobile! Payscraper gives the big control advantages of (1) exclusive International rack-and-pinion plus tandem pump steering system; and (2) 3-degree forward spindle pitch that improves scraper balance and prevents "nose downs" in high-speed turns. The 16-adjustment, bump-smothering seat builds operator confidence, too. And reach-easy power brakes, "control tower" vision, and flush deck safety help him deliver full Payscraper capacity, and take advantage of speeds up to 33.5 mph. He commands ample power and traction to pull *directly* out of 90-degree turns, even on soft fills!

**The fast, positive-acting Payscraper ejector mechanism** is powered by the International PTO-driven Cable Control Unit. One cable drum of this simple planetary system actuates the apron and ejector; the other drum positions the bowl to control spreading action. Apron lifts to a big 94-inch opening. Two ejector-plate pushing members apply dozer-like action to force out the whole 34-cu. yd. load cleanly. Action of six heavy-duty springs, stretched during ejection, positively powers the ejection mechanism's return!

**Here's your 76-page cost and production estimating book—** newest, most authentic and complete guide for estimating material-moving costs—and for selecting equipment combinations for top profits, *anywhere!* Yours for the asking from your International Construction Equipment Distributor!

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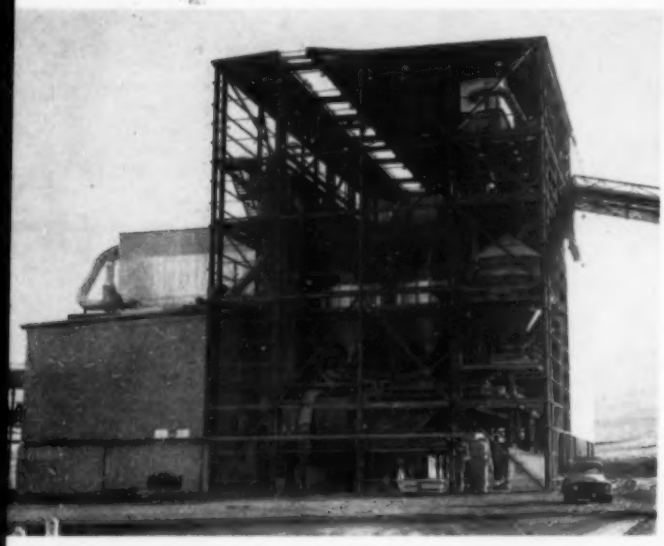
A Complete Power Package

**International® Construction Equipment**

## GLEN CANYON DAM SPAWNS PHOENIX CEMENT

*continued from page 124*



MILLS, SEPARATORS, bins and dust collectors were fitted into the mill building like pieces of a huge three-dimensional jig saw puzzle. The mill building can be expanded at both ends

much dust control was built into this cement plant in a remote part of Arizona as if it had been in a metropolitan area. This was no accident. Not only do the bag collectors retain valuable fine product, but they protect the air-conditioning system in the mill control room.

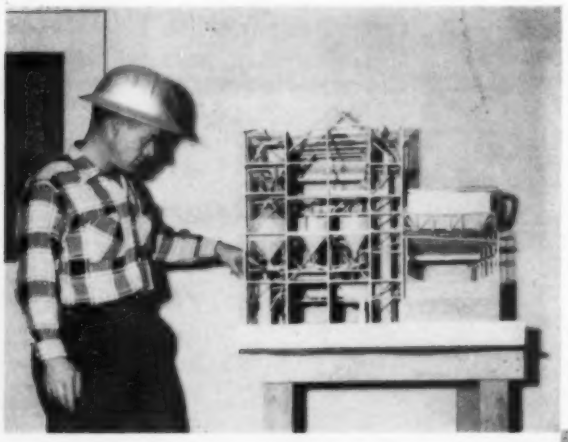
Controls for the mills are in a pressurized, air-cooled room. With the arid climate, cooling is accomplished by passing air through a spray chamber. This room also houses the big 1,250-hp. motors and reducers that drive the mills. Air conditioning provides a dust-free atmosphere for the sensitive instruments and electrical equipment; at the same time, it dissipates the heat generated by the huge motors and reducers.

Kiln feed is pumped to one of two concrete storage silos. One of these silos is taking newly milled raw feed, while one or both are discharging to a single, homogenizing silo. Homogenizing is achieved by forcing air up through porous ceramic plates in the bottom. Thoroughly mixed materials are then pumped to a steel surge bin far above the two big kilns.

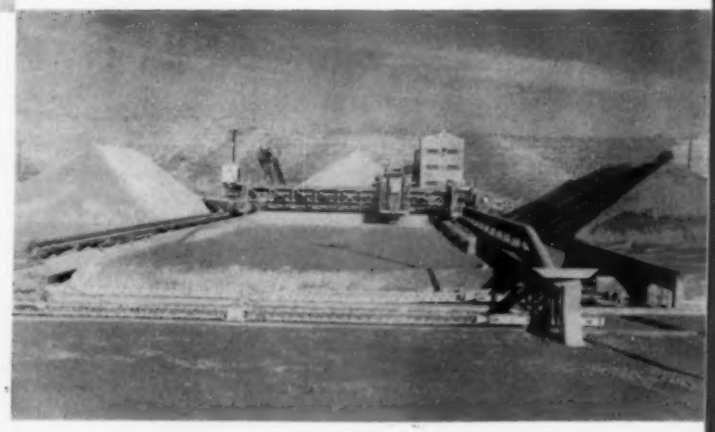
**Preheaters step up kiln efficiency enormously.** Raw material from the surge bin is at an ambient temperature of 120 deg. F. and is pulled out with tubular screw feeders and delivered to weighing belt feeders above the preheaters.

The preheaters are simply two double cyclones which introduce cold feed into the blast of hot exhaust from each kiln. One cyclone is nested inside the other to give the raw feed two passes through the hot gases from the kiln. In the process the feed reaches about 1,200 deg. F. and the exhaust temperature is knocked down to less than 750 deg. F.

*Please turn to page 134*



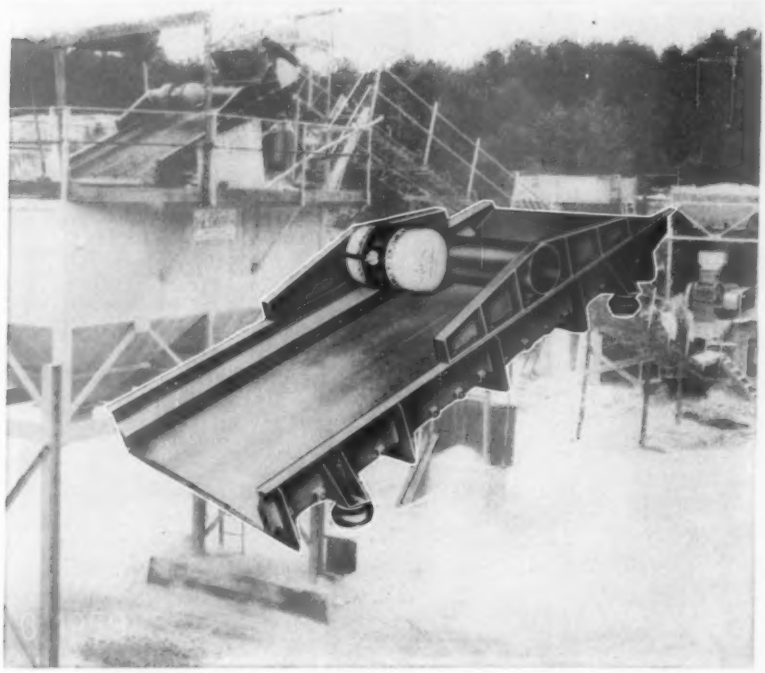
PHOENIX' FLAIR FOR DESIGN DETAIL was demonstrated by this scale model of the mill building and its air-conditioned control room. Charles W. Fox, operations manager at Clarkdale, was project engineer during construction of the new plant



TRAVELING DIGGER with a 16-ft. diam. bucket wheel gnaws endlessly at the piles of stored materials—mixing and tumbling them thoroughly in the process

SYNTRON cost-reducing equipment of proven dependability

# for efficient high capacity screening



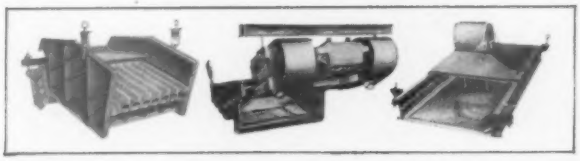
## SYNTRON VIBRATING SCREENS

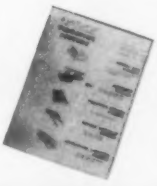
SYNTRON builds a vibrating screen for almost every screening need.

SYNTRON Vibrating Screens have been tested and proven in many sand and aggregate processing applications—sizing, dewatering, media recovery, wet and dry sizing and fine screening. Uniform quality control screening means consistently high quality products.

SYNTRON Screens offer efficiency, dependability and low maintenance for better screening, higher capacity at lower cost.

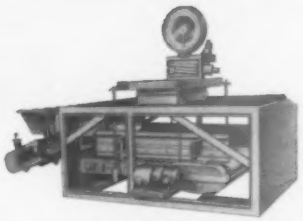
**Other SYNTRON Vibrating Screens**





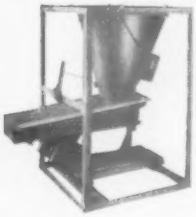
*Write for the catalog section on Vibrating Screens.*

## Other SYNTRON Equipment of proven dependable Quality



GRAVIMETRIC FEEDERS

DRY FEEDER MACHINES



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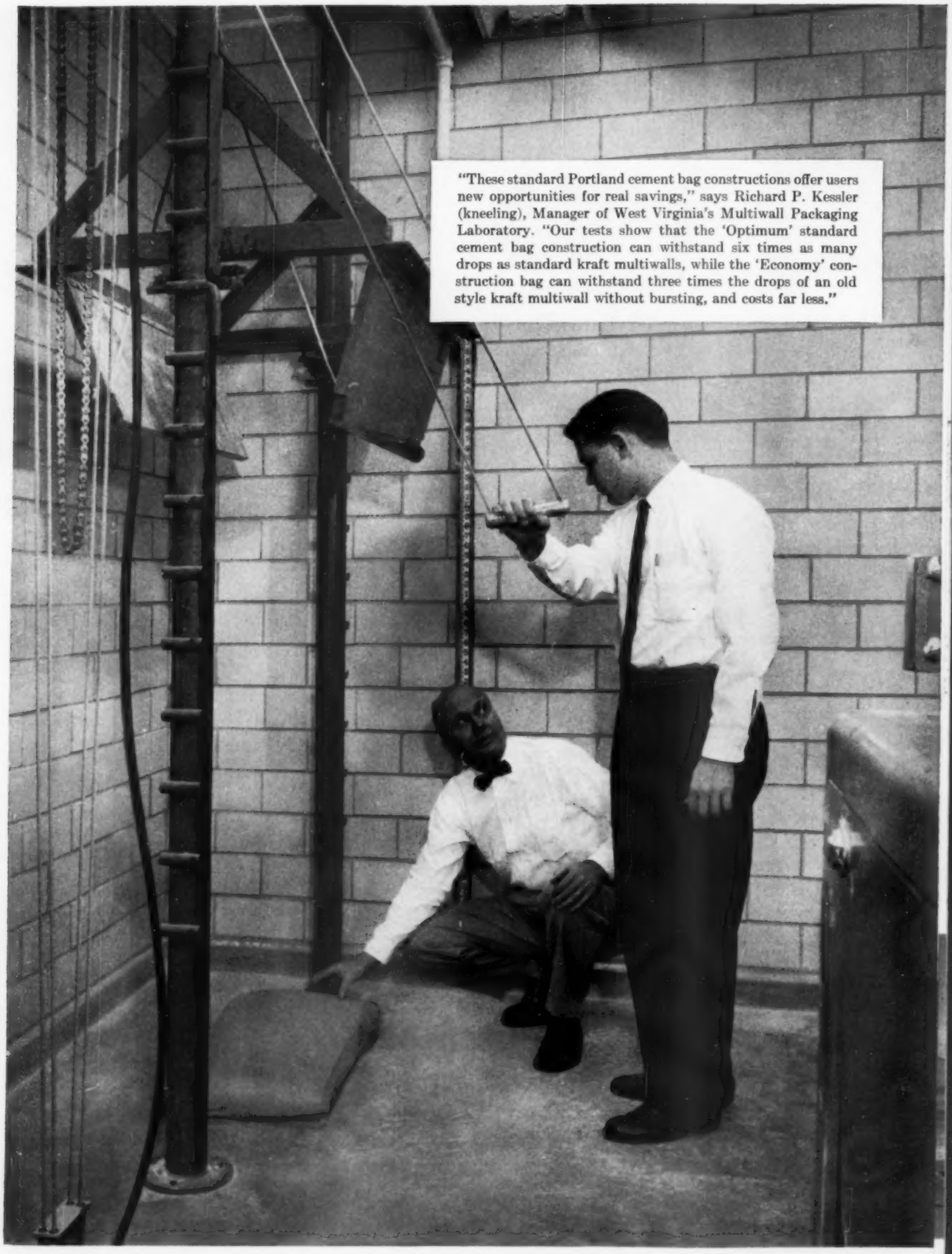

"These standard Portland cement bag constructions offer users new opportunities for real savings," says Richard P. Kessler (kneeling), Manager of West Virginia's Multiwall Packaging Laboratory. "Our tests show that the 'Optimum' standard cement bag construction can withstand six times as many drops as standard kraft multiwalls, while the 'Economy' construction bag can withstand three times the drops of an old style kraft multiwall without bursting, and costs far less."

# NEW!

# WEST VIRGINIA'S 1960 STANDARD BAG CONSTRUCTIONS TO SAVE YOU MONEY

Substantial savings for cement companies are achieved by two new standard WONDERWALL bag constructions perfected by West Virginia for packing Portland cement.

During a controlled test to determine possible savings in bag costs, various WONDERWALL constructions were developed in our Multiwall Packaging Laboratory. They were tested by 24 plants which shipped 1,118,415 barrels of cement in 5,282,966 WONDERWALL bags.

Result of this laboratory and field proving was the development of the superior "Optimum" and "Economy" bags for packing Portland cement. The new constructions are shown in the box.

*The new 3-ply Economy* WONDERWALL *is tougher than the 4-ply natural kraft multiwalls in all respects, and offers a cash saving of $2.75 per M in bag cost.*

The 3-ply Optimum WONDERWALL gives far better performance than the heavier 4-ply kraft multiwall, both in the mill and in transit. Whereas natural kraft breakage ran as high as 5% in truck shipments, the WONDERWALL Optimum bag reduced it to less than 1%. Breakage in rail shipments dropped from 6 to 10 bags per car to 1 or 2 maximum. The reduction in bag breakage alone provides a realistic cash saving, to say nothing of improved customer and employee satisfaction.

Secret of WONDERWALL strength is Kraftsman Clupak* extensible paper. Its built-in stretch withstands far more impact without breaking than conventional natural kraft. In a WONDERWALL bag, fewer plies are needed to do the job!

See how WONDERWALL standard bag constructions can cut your costs, increase your profits. Our technical service experts are ready to help you take full advantage of these new bag developments; call or write Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Avenue, New York 17, N.Y.

**Clupak, Inc.'s trademark for extensible paper manufactured under its authority and satisfying its specifications.*

**NEW STANDARD WONDERWALL CEMENT BAG CONSTRUCTIONS**

| Pounds Packed | Old Style Natural Kraft Construction | Optimum Wonderwall | User Benefit |
|---|---|---|---|
| 94# | 3/40, 1/50 | 3/50 | less breakage |

| | Economy Wonderwall | |
|---|---|---|
| 94# | 3/40, 1/50 | 1/50, 1/40, 1/50 | $2.75/M and less breakage |

WONDERWALL bags of the "Optimum" construction have reduced breakage at the North American Cement Corporation's Security, Maryland, plant.

**West Virginia Pulp and Paper**

*Enter 1076 on Reader Card*

## GLEN CANYON DAM SPAWNS PHOENIX CEMENT

*continued from page 130*

Preheating has two desirable results—the heat balance in the kiln is not disturbed by the steady influx of "cold" raw feed, and the 1,400 to 1,500 deg. F. exhaust gas is tempered before it is introduced into the dust collecting system.

In the first few months of operation this system has proved to be very efficient. Little cold dust fails to become air-borne in the main exhaust duct and, apparently, very little hot dust recycles through the system.

This dust is caught in a pair of parallel cyclone dust collectors just beyond each preheater, and the dust is dropped to a reclaim screw. By this time, the gas temperature has been reduced to 500 deg. F. and it passes to a baghouse for a final pass through air filters. The baghouse is equipped with silicone-treated Fiberglas bags. Dust is gathered in the reclaim screw and returned to the kiln or collected in a truck hopper.

Each of the two kilns is 350 ft. long and 12-ft. diam. for the first 90 ft.; it tapers to 10 ft. diam. for the rest of the length. Natural gas provides the fuel, and the kilns burn about 100,000,000 Btu. per hr. at normal operating rate. The 7 x 40-ft. horizontal clinker cooler under the discharge of each kiln provides heated secondary air while venting excess cooler air to the atmosphere.

Clinker is dropped to a wide-chain drag conveyor which gathers discharge from both kilns. This conveyor drops clinker to a long belt conveyor for the trip to the sample tower.

Extra flexibility was designed into the clinker handling system. The chain conveyor gathering clinker can discharge it into the boot of a bucket elevator instead of into the long belt conveyor. In this way clinker can be loaded into trucks or stored. This piled clinker can be returned to the system through a rack and pinion gate in the bottom of a small truck hopper.

Clinker from both kilns converges on the belt conveyor and is sampled as it goes to storage. The storage system thoroughly mixes clinker from both kilns, both as it is stocked out on the traveling stacker and as it is reclaimed with the traveling digger. Just as in the raw material storage system, one pile of clinker is built while another is reclaimed.

The cement storage system at Clarkdale is geared to the marathon Glen Canyon haulage project. Finished cement is stored in one of 10 concrete silos holding a total of 180,000 bbl. of cement. An airslide system on each row of silos permits two tandem rigs to be loaded at the same time; two discharge spouts on each side load each trailer body.

This kind of loading efficiency will help speed each of the 20 tandem cement-hauling rigs on its way. It takes each about 5½ hr. to make the long 190-mi. grind to Glen Canyon and about 4½ hr. for the return run empty. Each aluminum trailer body holds about 125 bbl. of cement, and each has a quick-opening valve in the bottom to discharge cement as fast as it was loaded. First trip to the mammoth dam left Clarkdale on Feb. 8, 1960, and hauling will continue on a 24-hr. schedule for more than three years.

But Phoenix Cement Co. is not putting all its eggs in the one big basket. It is looking forward to the time when the market in northern Arizona will take all of the new plant's output—and then some.

So confident is the management that it provided for increase in capacity. The plant production can be doubled with modest expenditure. The storage areas can readily be expanded with the addition of only a few belt conveyors and an extension of the transfer track. Oversize machinery was installed originally—it will be a simple matter to install larger motors and reducers on the belt conveyors to handle more material at a faster rate.

The carefully designed mill building can be extended in either direction to accommodate more mills, separators and coolers. **END**

### MAJOR EQUIPMENT REFERENCE

| | |
|---|---|
| Quarry trucks, 25-ton (5) | Euclid Div., GMC |
| Cement trucks | Autocar, Div. of White Motor Co.<br>International Harvester Co. |
| Cement trailers, 125 bbl. | Fruehauf Trailer Co. |
| Rotary drilling rig | Schramm, Inc. |
| Wagon drill | Gardner-Denver Co. |
| Shovels, 4½, 2½-cu. yd. elec., (2) | Marion Power Shovel Co. |
| Shovel, 2½-cu. yd. diesel, (1) | Northwest Engineering Co. |
| Wobbler feeder, 5 x 23-ft. | Universal Engineering Div. |
| Jaw crusher, 48 x 60-in. | Allis-Chalmers Mfg. Co. |
| Metal detectors, (2) | RCA, Inc. |
| Nuclear detectors, (3) | Industrial Nucleonics, Inc. |
| Weighing feeders, (3) | Jeffrey Mfg. Co. |
| Secondary crusher | Williams Patent Crusher & Pulverizer Co. |
| Dust control system | Johnson-Marsh Co. |
| Samplers, (4) | Galigher Co. |
| Weighing belt feeders, (4) | Merrick Scale Mfg. Co. |
| Mills, 12 x 19-ft. (3)<br>Preheaters, (4)<br>Kilns, 10 x 350-ft. (2)<br>Cement coolers, (2) | F. L. Smidth & Co. |
| Sample mills, (2)<br>Air separators, 14-ft. (4) | Combustion Engineering Co. |
| Kiln dust collectors | Buell Engineering Co. Inc. |
| Bag collector system | Coast Engineering & Supply Co. |
| Electric motors and controls | General Electric Co. |
| Overhead cranes, (5) | Harnischfeger Corp. |
| Belt conveyors & stackers<br>Vibrating screens, (3)<br>Conveyor idlers & belts | Hewitt-Robins, Inc. |
| Reducers | Jones Div., Hewitt-Robins, Inc. |
| Truck tires | General Tire & Rubber Co. |
| Concrete silos | Macdonald Engineering Co. |
| General contractor | Fisher Contracting Co. |
| Plant design | American Cement Corp. |



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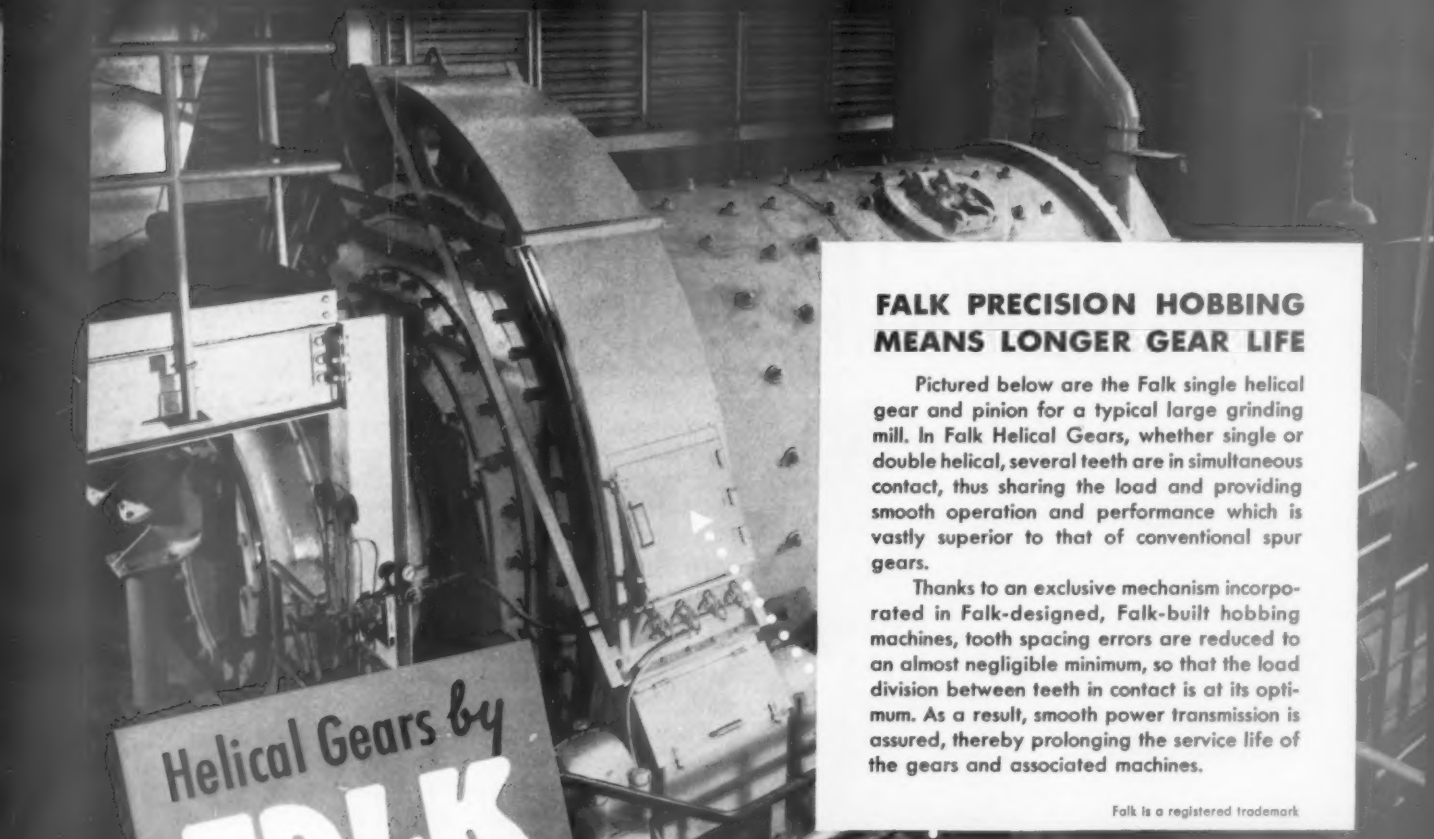


## FALK PRECISION HOBBING MEANS LONGER GEAR LIFE

Pictured below are the Falk single helical gear and pinion for a typical large grinding mill. In Falk Helical Gears, whether single or double helical, several teeth are in simultaneous contact, thus sharing the load and providing smooth operation and performance which is vastly superior to that of conventional spur gears.

Thanks to an exclusive mechanism incorporated in Falk-designed, Falk-built hobbing machines, tooth spacing errors are reduced to an almost negligible minimum, so that the load division between teeth in contact is at its optimum. As a result, smooth power transmission is assured, thereby prolonging the service life of the gears and associated machines.

Falk is a registered trademark

Helical Gears by FALK

# ...your Best Buy in gears!

In these times of industrial expansion and modernization, Falk Helical Gearing is more than ever the first choice of experienced, economy-minded users of gear-driven equipment.

This increasing preference is the result of proved performance. Falk Helical Gears and Pinions provide *better performance over a longer service life* because they are correctly engineered...their accurately generated teeth have extra depth and extra capacity...gear efficiency, as shown by actual test data, is 98+%...the highest you can buy!

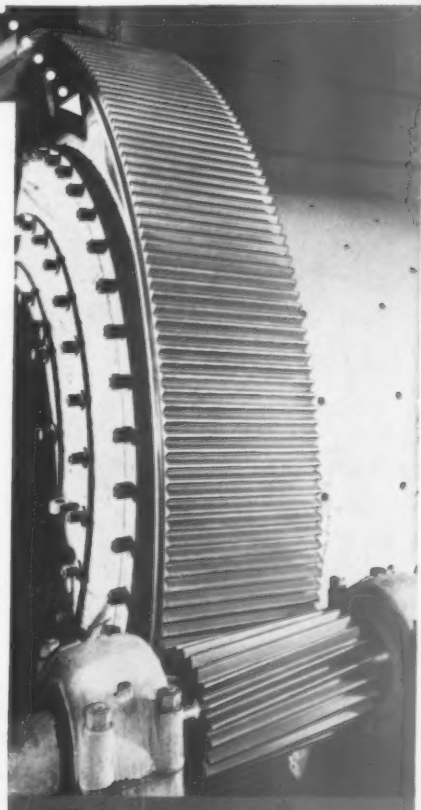
Other superior features include: high reduction ratios which permit use of higher motor speeds for greater efficiency and reduced power costs; maximum resistance against abrasive wear; smooth, helical gear action. All these factors contribute to the long service life of trouble-free operation for which Falk gears are famed the world over.

When expanding or remodeling your production facilities, it pays to remember that the performance of your equipment will not be any better than the performance of the gears that drive it. So, if uninterrupted production is important to you, specify Falk Helical Gears. They're available in sizes up to 23½ ft. in diameter...in capacities up to 3000 hp.

Consult any Falk representative—also, write for
**Engineering Report 6170,** "Advantages of Helical Gearing."

**THE FALK CORPORATION, 3001 W. CANAL ST., MILWAUKEE 1, WIS.**

Representatives in Most Principal Cities



**FALK**

...a good name in industry

# What you should know about the new labor law

by Joseph N. Bell

SENATOR JOHN L. MCCLELLAN, Democrat of Arkansas and chairman of the Senate Rackets Committee, is credited with paving the way for the passage of the labor reform law of 1959

ON SEPT. 14, 1959, President Eisenhower signed into law a bill known as the "Labor Management Reporting and Disclosure Act of 1959." A somewhat watered-down version of several proposed tougher pieces of legislation—principally The Landrum-Griffin bill—this new labor law is the first major labor legislation since the Taft-Hartley Act of 1947. It has profound meaning for every member of the rock industries. Its provisions should be known, understood and acted on.

At the time the bill was passed, there was a great deal of hue and cry from spokesmen for both big labor and big business. It is, perhaps, a left-handed tribute to the law that it was attacked by both groups.

David Lawrence, for example, said of it: "It would be unfortunate if the country got the impression that the new law to provide certain 'labor reforms' is really a cure-all for the many abuses that have been uncovered in union practices . . . It says absolutely nothing about the most important of all civil rights in the employment field—the right to join or refuse to join a labor union . . . This form of compulsion is, unfortunately, permitted under the Taft-Hartley Act, and it might be thought that, with all the talk about 'labor reform,' some start would have been made in the new law to emancipate those who are held under such bondage."

From the other camp comes this assessment, which appeared in the publication of the Cement, Lime and Gypsum Workers: "The U. S. Congress has done it again. It has struck a serious blow against you and your security by passing a law which may seriously curtail the effectiveness of your union . . . Supposedly designed to eliminate corrupt influence in labor-management relations, the law generally is a wolf in sheep's clothing. The Act goes much further than its intended purpose. It strengthens an employer's hand at the bargaining table, yet weakens and undermines a union's right to organize."

Now, eight months later, the sound has died down somewhat and the new law is in full operation. Temperate people on both sides of the dispute generally are agreed that the law was badly needed, and that it takes some positive steps toward correcting serious excesses in the operation of trade unions.

It can't be emphasized too often, however, that unless the people for whom the law is designed to

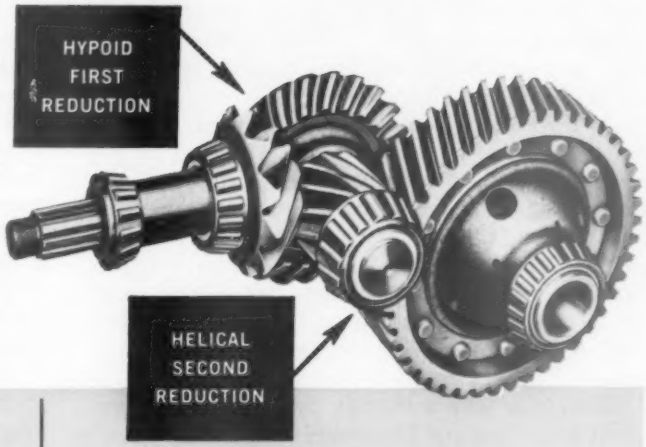
*Please turn to page 138*

## Heavy-Duty Hauling Jobs Are Easy With Timken-Detroit®

# BALANCED

## HYPOID-HELICAL DOUBLE-REDUCTION AXLES

Timken-Detroit balanced hypoid-helical double-reduction gearing is unequalled for top performance and dependability. Outstanding advantages that make it the choice of heavy-duty equipment manufacturers and operators are: big, husky gears . . . greater flexibility in gear ratios . . . balanced gear set loadings . . . long life and low maintenance costs. The hypoid first reduction is 30% stronger than spiral bevel, and works in series with the second reduction to take an equal share of the load. In the helical second reduction, strong helical gears with a wide range of ratios insure balanced double-reduction gearing.




### 240 SERIES
**SINGLE-SPEED, HYPOID-HELICAL DOUBLE-REDUCTION**

Two full-sized gear sets form a balanced power train—with each gear set accomplishing a substantial reduction. This combination of husky hypoid first reduction gears coupled with rugged, wide-faced helical second reduction gears provides a double-reduction gear set that outperforms all others. Because the ratios of each reduction may be varied, you get a balanced power train with the larger selection of axle ratios for maximum operational versatility and performance.

### 340 SERIES
**TWO-SPEED, HYPOID-HELICAL DOUBLE-REDUCTION**

A true two-speed axle which provides two separate gear ratios through the use of two full-size helical gear sets . . . a "fast" ratio for maximum speeds and a "slow" ratio for greatest pulling power. Pick the most efficient gear ratio to meet your requirements of speed, load and road. Spring-flex power shifting provides simple, positive shifting with either air, vacuum or electric actuation. Timken-Detroit two-speed hypoid-helical double-reduction axles give a versatility and economy to trucking operations that is unmatched by other axle gear designs.

*choice of two—*

**INTERCHANGEABLE BALANCED DOUBLE-REDUCTION DRIVES**

*Another Product of...*

**ROCKWELL-STANDARD CORPORATION**

Transmission and Axle Division, Detroit 32, Michigan

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## WHAT YOU SHOULD KNOW ABOUT THE NEW LABOR LAW

*continued from page 136*

protect are aware of its provisions, it obviously can provide them little benefit. In this instance, we mean the employer, the rank-and-file union member and, in some instances, the union itself.

This applies to all producers in the rock industries. There simply is no substitute for a careful, thoughtful reading of the bill—even though it is long, dull and sometimes unnecessarily obtuse.

The following highlights of the bill are just that: main ideas—extracted, condensed and offered as a guide to rock producers. They're offered as well as an incentive for operators to study the law, itself. The National Sand and Gravel Association and the National Crushed Stone Association have prepared, with the help of legal counsel, excellent summaries of the new law. We are particularly indebted to them, and to the Chamber of Commerce of the United States, as sources for much of the information that follows.

Now, let's take a look at the "Labor Management Reporting and Disclosure Act of 1959."

**The new labor bill is divided into two distinct parts:** (1) regulation of internal union affairs, aimed at protecting the rights of individual union members and (2) correction of excesses in labor-management relations (mostly union coercive practices). Let's look first at the portion of the bill dealing with internal union problems.

1. The first section of the new law contains a "Bill of Rights" for union members. It's principal provisions include:

—Equal rights among members to nominate candidates for office, vote, attend meetings and participate in discussions;

■ *In almost every editorial survey conducted by* ROCK PRODUCTS, *members of the rock industries have named labor as the principal problem afflicting them in business. In an effort to provide its readers with the information they want and need,* ROCK PRODUCTS *begins, with this article, a series on labor problems in the rock industries. The first article will deal with provisions of the new labor law of special interest to rock producers. Succeeding articles will describe, in some detail, specific labor disputes in the rock industries in various parts of the country, emphasizing the lessons that can be drawn by rock producers from the experience of others in dealing with labor problems.*

—The right to meet and assemble freely with other members and express any views or opinions, subject to "reasonable rules" in the by-laws of the union. (This could turn out to be an unintentional encouragement of wildcat strikes under the "meet and assemble" guarantee.)

—Dues or assessments can't be raised except by majority vote of all members of a local, or by an assembly of delegates, referendum or executive board action of a national or international union;

—Labor organizations cannot prevent individual members from suing the union in court or appearing as a witness in any proceeding involving the union;

—No union can discipline a member (except for nonpayment of dues) unless the member is served with specific written charges, given reasonable time to prepare his defense, and offered a full and free hearing.

2. In addition, the new labor law tightens the regulation of internal union affairs by:

—Setting up strict regulations on the procedures to be followed when a union assumes trusteeship over a subordinate union;

—Tightening considerably the rules governing union elections, terms of office and qualifications of officers. (Members who have been card-carrying Communists or convicted felons within the past five years cannot hold union office);

—Requiring bonds of union officials who handle funds, making embezzlement or theft of union funds a federal offense, and limiting indebtedness to the union on the part of an individual official or member to $2,000;

—Making it a criminal offense for union officials to receive illegal payments from an employer or to charge a fee—over and above services as an employe—for unloading any motor carrier.

3. Detailed written reports are now required from every union annually. They become public documents. Information required includes:

—Constitution and by-laws, plus a detailed description of the structure and internal procedures of the union;

—Complete financial report, including all transactions involving any possible conflict of interest;

—Any personal financial transactions on the part of union officers that might involve conflict of interest.

Moving now to the field of labor-management relations, there are six major changes in the new labor law materially affecting some of the primary causes of labor difficulties in the past.

*Please turn to page 144*



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# B.F.Goodrich develops 2 new long-wear tire compounds

## B.F.Goodrich Cut Protected and Heat Resistant compounds boost tire life, cut costs on heavy construction and earth-moving jobs

THE most costly tire-killers on construction projects are either rock cuts or heat build-up. A B.F.Goodrich research team went to work on the problem, tested and researched various compounds, then developed the first truly Cut Protected and Heat Resistant compounds on the market.

Cut Protected compound gives longer service on jobs where:
- Rock cutting, chipping and abrasive wear are severe.
- Round-trip hauls are short.
- Trucks travel at low speeds.

Heat Resistant compound defies heat build-up on jobs where:
- Haul roads are well maintained.
- Trucks travel at high speeds.
- Cutting and chipping are at a minimum.

Tests show these compounds outperform any others available today. Ask your B.F.Goodrich dealer about them—find out how they can save *you* money.

**HERE'S UNRETOUCHED PROOF** of how the new B.F.Goodrich Cut Protected compound wears longer. Both tires were in service at the same time on identical jobs under identical conditions. Yet the Cut Protected compound tire above has given *approximately 3 times more service* than the tire below. Note how little the Cut Protected tread is worn.

**SCRAPER HAULS 35 TONS OF CLAY AND SAND** to grade new Interstate Highway No. 1202-(1)-9 in Conecuh County, Ala. Equipment works 60 hours a week on stop-and-go runs of a mile or less. Here's a job for the new B.F.Goodrich Cut Protected compound. On long, high-speed hauls, you'd choose the new Heat Resistant compound.

**More highway construction news from B.F.Goodrich**

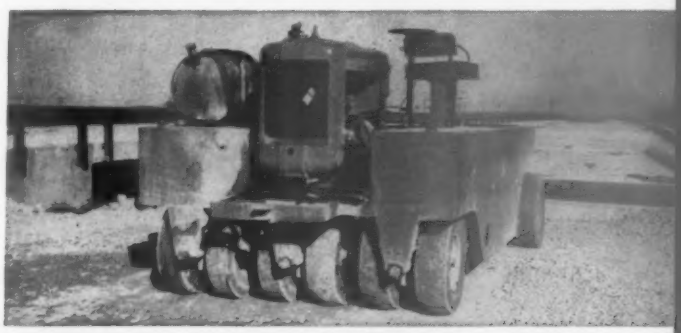
**RUSHING HIGHWAY CONSTRUCTION** near Lackland Field, this giant Killian-House scraper is loaded with 30 tons of earth. Tires are B.F.Goodrich Rock Service Tubeless, designed with massive double-chevron cleats for extra traction, forward or reverse. Rock Service tires are available in the new Cut Protected compound that defies rock cuts and snags, in the new Heat Resistant compound that withstands dangerous heat build-up, or in the Regular compound for normal service.

# How long-wear B.F.Goodrich tires

**HYDRAULIC DUMP TRUCK** deposits asphalt to pave highway 25 miles southwest of San Antonio. Front tandem tires are B.F.Goodrich Power Express. Rear tandems are Traction Express on 4th retread. B.F.Goodrich FLEX-RITE NYLON cords withstand double the impact of ordinary materials, resist heat blowouts and flex breaks. That's one reason why Traction Express tires can be retreaded again and again.

**B.F.GOODRICH ON-THE-JOB SERVICE** helps contractors cut costs to a minimum. Servicemobile is equipped with all the latest power tools, including hydraulic cranes, bead jacks and pneumatic wrenches. B.F.Goodrich Tire Service Men handle any type tire on any type equipment, work quickly and efficiently. Best of all, B.F.Goodrich Tire Service Men are there when you need them.

**6,000-GALLON WATERWAGON** rolls on B.F.Goodrich Earth Mover tires. Note the unusual "button" tread. Hundreds of sharp edges bite into the ground to keep the tire from skidding or slipping. Yet the Earth Mover's wide tread keeps the tire on top of soft soil. Work stays on schedule.



**HELPING COMPACT EARTH** is the job of the 13 B.F.Goodrich smooth-tread tires on this road roller. Other Killian-House equipment includes 30 flat bed and water trucks, 10 scrapers, 15 maintainers, 30 pickups and 30 hydraulic dump trucks—all on B.F.Goodrich tires.

**KILLIAN-HOUSE RELIES** on B.F.Goodrich truck and trailer tires to move 200 amp. welding machine to equipment repair jobs. Altogether, this contractor uses nearly 800 B.F.Goodrich tires to help speed highway construction in Southwest Texas.

B.F.Goodrich Smileage!

# keep highway construction on the go

KILLIAN-HOUSE, one of the biggest highway and bridge construction companies in Texas, operates out of headquarters in San Antonio—maintains three field offices with 2-way radio hook-up to help service jobs currently worth more than twelve million dollars.

Every day a fleet of 143 units goes to work on B.F.Goodrich tires—scrapers on Rock Service tires, dump trucks on the Traction Express, maintainers on Power Grader tires, water trailers on Super Traction tires, pickups on the Power Express—even company cars on B.F.Goodrich Life-Saver Tubeless tires.

Why this vote of confidence in B.F.Goodrich? "Because," says General Superintendent Glen Quick, "they are the best tires for the job. For example, we once got only 30,000 to 50,000 miles from truck tires. Costs were enormous. Now B.F.Goodrich Traction Express tires give us 60,000 to 90,000 miles, cutting our costs in half."

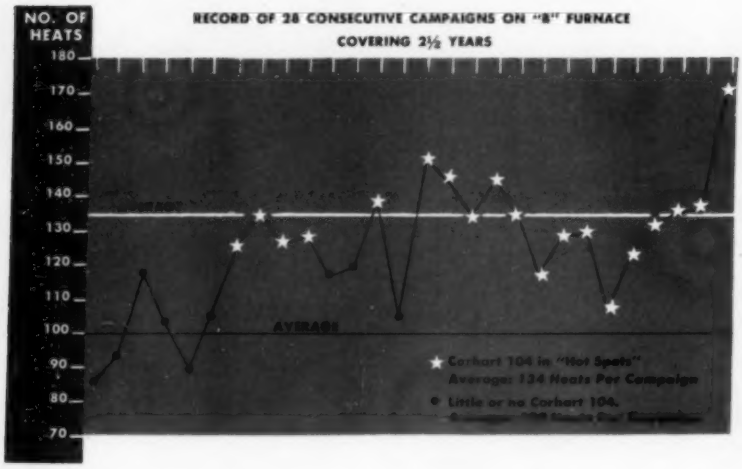
Why not have a talk with your B.F.Goodrich Smileage dealer. He has long-wear tires for every type of off-the-road work and tire service that keeps construction on the go. Look under Tires in the Yellow Pages of your phone book. *The B.F.Goodrich Company, Akron 18, Ohio.*

**SPECIFY B.F.Goodrich Tubeless or tube-type tires when ordering new equipment**

**OFF-THE-ROAD TIRES BY B.F.Goodrich**

# Now! Corhart 104 cement kiln

## Corhart boosts glass, steel furnace life




**CORHART 104 "BEEFS-UP" STEEL FURNACE HOT SPOTS...** Corhart 104, the same basic refractory that is now being successfully used in cement kilns, was first developed to "beef-up" trouble areas in steel furnaces. Steel furnace performance curves, such as this one for a 60-ton electric furnace, consistently prove that Corhart 104 withstands the tremendous heat and thermal shock of steel melting cycles far longer than other basic liners. Average "heats" for this furnace increased from 100 to 134 per campaign when Corhart 104 was used to fortify serious wear areas. The result is lower repair costs, more furnace availability, increased productivity.

**CORHART ELECTROCAST AFTER FOUR YEARS IN GLASS FURNACE...** The Corhart Electrocast lining in this glass furnace firing port has been four years in operation. This record is several times better than can be achieved with ordinary refractories, *yet wear* on the Corhart *is hardly detectable*. It is only one of hundreds of installations where Corhart's resistance to the intense heat and corrosive attack of molten glass has proved superior to that of other glass tank refractories. Since its introduction in 1927, Corhart Electrocast has helped *double* and *redouble* glass furnace life. Today, Corhart is nearly always the predominant refractory in glass tanks.

# Electrocast for hot zones!

## An electrically-melted basic refractory test-proved superior to conventional basic hot zone liners

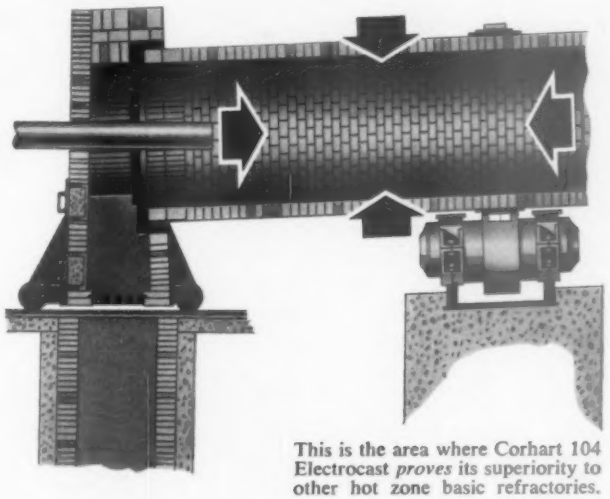
YEAR after year—for more than 30 years—Corhart Electrocast Refractories have *consistently* outlasted *all other* materials in the most severe wear areas of glass furnaces. More recently, real progress has been made in the "Hot Spots" of open hearth and electric steel furnaces. (See reports on opposite page.)

And now, cement kiln operators are installing test-proved Corhart 104 Electrocast in their hot zones for increased refractory life and lower operating costs. Here are some of the reasons why Corhart 104 can provide these benefits:

- **1000° F. margin of safety in operation.**
- **Superior spall resistance.**
- **Readily attracts and tenaciously clings to clinker coating.**
- **Chemically non-reactive with cement clinker.**
- **Improved resistance to thermal shock due to temperature cycling.**
- **Corhart-engineered installations for maximum economy.**

What makes Corhart 104 so superior to other hot zone liners? By far the *most important difference* is Corhart's process called "Electrocasting." This process involves electrically-melting the raw materials at 4450° F. and higher, then pouring into preformed molds. The molten material quickly freezes to form a tight interlocking crystalline structure which is non-porous, corrosion-resistant and possesses great mechanical strength at high temperatures . . . excellent hot zone properties.

Leading cement producers are installing Corhart 104 in extreme hot zones to reduce costly downtime for repairs, to cut total refractory costs and to provide lower operating costs through more continuous production. *Clip and return the coupon below for complete performance data and other details on this new hot zone refractory.*



This is the area where Corhart 104 Electrocast *proves* its superiority to other hot zone basic refractories.

QUALITY ENDURANCE

**CORHART REFRACTORIES COMPANY**

**Subsidiary of Corning Glass Works**

*The words "Corhart", "ZAC", and "Electrocast" are registered Trade Marks which indicate manufacture by Corhart Refractories Company, Incorporated.*

Corhart Refractories Company
944 Commonwealth Bldg.
Louisville 2, Kentucky

Please send me your complete Fact File on Corhart 104 Electrocast refractory for cement kiln hot zones.

Name_____

Company_____

Address_____

City_____ State_____

*Enter 1130 on Reader Card*

## WHAT YOU SHOULD KNOW ABOUT THE NEW LABOR LAW

*continued from page 138*

THE AUTHORS AND SPONSORS of the important Landrum-Griffin bill which President Eisenhower signed into law are Representatives Phil M. Landrum (left), Democrat of Georgia, and Robert P. Griffin, Republican of Michigan

1. The jurisdictional "no-man's land" has been abolished. Formerly, labor disputes too small for a swamped National Labor Relations Board to handle were simply permitted to drift. Under terms of the new labor law, nothing "shall be deemed to prevent or bar any agency or the courts of any State or Territory" from taking jurisdiction over labor disputes on which the NLRB declines jurisdiction. In other words, the aggrieved small businessman now has somewhere to go with his labor problems. A whole body of state labor laws, which have been gathering dust since the federal government moved into the labor picture, now will be revived at the state and local level.

2. Secondary boycotts have been defined and specifically outlawed. A striking union cannot induce any individual employed by another employer to engage in secondary boycotts, or induce or encourage strikes against a secondary employer.

3. "Hot cargo" clauses have become an unfair labor practice under the new Act. Employers can no longer agree with a union to stop handling the products of another employer embroiled in a labor dispute. Any existing "hot cargo" agreements are now unenforceable.

There is a specific exception to this ruling that may haunt the rock industries. The ruling does not apply to "an agreement between a labor organization and an employer in the construction industry relating to the contracting or subcontracting of work to be done at the site of the construction, alteration, painting, or repair of a building, structure or other work."

The boundaries of the "construction industry" and what constitutes a "construction site" may have to be defined by the courts. In the meantime, it can be hoped only that this vague terminology doesn't trap too many rock producers who finally can see their way out of "hot cargo" agreements.

The broad language of this provision also may affect subcontracting agreements that have long been a part of routine business operating procedure. This clause should be reviewed carefully in relation to existing operating agreements.

4. Workers (even those not entitled to reinstatement in their jobs) involved in a strike against their employer can vote—under the new law—in any representation election, providing it occurs within 12 months of the time when the strike starts. Previously, workers engaged in an "economic" strike—e.g., for more money—couldn't vote in a representation election. Again, there is much confusion as to the circumstances under which this applies. What it probably boils down to is that the NLRB will wind up establishing individual ground rules for each such dispute.

5. The new statute outlaws picketing to force an employer to recognize or bargain with a union or to force employes to join it under certain circumstances. These include cases in which (a) another union has already been lawfully recognized; (b) the picketing union has lost a representation election in the past 12 months, and (c) picketing has gone on for 30 days without the picketing union petitioning for an election.

"Blackmail" picketing for extortion purposes or to force recognition by an employer is made a criminal offense. (In Connecticut recently, a court stopped picketing by the ITU when it didn't file an election petition with the NLRB. In this instance, the court interpreted the picketing provision to apply even to majority unions.)

6. A specific exception to the terms of the Act is set forth for employers "engaged primarily in the building and construction industry." These employers can make an agreement with unions which requires union membership as a condition of employment, obligates the employer to notify the union of job openings and requires minimum qualifications—based on a number of variables—for employment. This is a throwback to the "hiring hall" concept, and rock producers may find

*Please turn to page 151*

# NEW from Cummins!
# Only from Cummins!

*The first V diesels of their size and h.p. built*

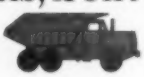
# VT8

*from the pan up for construction machines!*

# V8

# 430 h.p.

# 350 h.p.

Cummins has done it again! Built two V diesels in the much needed 350-430 horsepower class especially for construction machines. This opens a new world of *Cummins Diesel economy* for big scrapers, off-highway trucks, shovels, front end loaders and other equipment where there has  been a demand for compact yet large bore, big displacement engines.

The 350 h.p. and the 430 h.p. V8 engines are construction diesels from front to back, top to bottom. Every kind of application—every operating condition was considered in their design. The V8's represent the *most advanced* thinking in construction power on the market today! New features, major improvements combined with Cummins proven basic design makes them the most profitable source of power you can own or operate! And here's why...

**CUMMINS**

## CUMMINS ENGINE COMPANY, INC., COLUMBUS, INDIANA

INTERNATIONAL SALES & SERVICE — CUMMINS DIESEL INTERNATIONAL LTD., NASSAU, BAHAMAS — CABLE: CUMNAS
OVERSEAS FACTORY — CUMMINS ENGINE COMPANY LTD. — SHOTTS, LANARKSHIRE, SCOTLAND

Litho in U.S.A. — MP-60

# V T 8 · 4 3 0

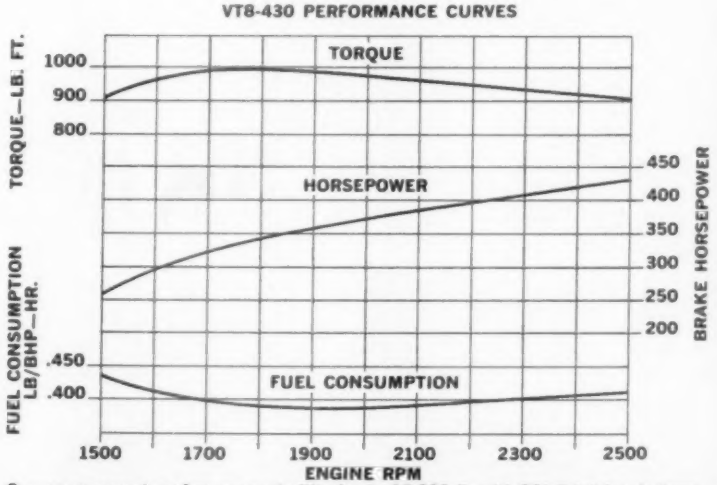
## THE DIESEL THAT DELIVERS THE PERFORMANCE OF ENGINES WITH *4 MORE CYLINDERS!*

**430 horsepower! 990 ft. lbs. peak torque! 950 cubic inch displacement! 7 lbs. per h.p.! Less than 59 inches long! Put these facts together and you have the rugged Cummins VT8-430 TURBODIESEL® Engine—the diesel that's as much as 40% smaller and more compact than engines in current use delivering equal power.**

From its very concept, the VT8-430 was designed to give you the benefits of turbocharging. Not only does turbocharging pack more power into the engine, but it assures full rated horsepower up to 10,000 feet. Cummins engineers have developed a lightweight, perfectly-balanced turbocharger that gives fast acceleration—trouble-free performance. Further, the VT8 operates at low exhaust temperatures assuring long life for both the engine and turbocharger.

Cummins puts the accessories on top of the block, in the "V" formed by the cylinder banks. This means greater accessibility, easier maintenance, less costly repairs. Internally, new insert-type injectors are much easier to install and service. Wet-type liners require less time to remove, less care to install. These are only few of the many advantages of this new Cummins Construction Diesel.

All in all, the VT8-430 gives you a combination of high performance, low fuel costs (see chart below), long operating life as well as a lower initial investment than the larger engines in its power class. You can't beat this kind of economy!




Curves represent performance at altitudes to 10,000 ft. with 90° F intake air temp.

# V8-350

## NEVER BEFORE, SO MUCH POWER FROM SUCH A COMPACT, NATURALLY-ASPIRATED DIESEL!

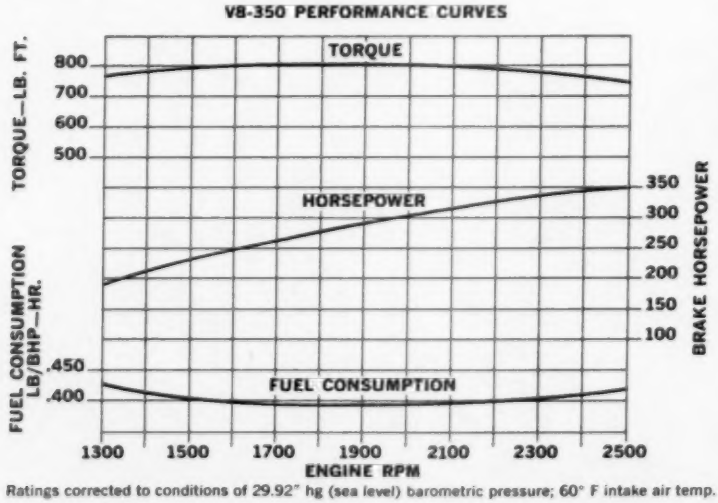
Here's rugged construction power! 805 ft. lbs. peak torque —*naturally!* (See curves below.) Like the VT8, this engine has a piston displacement of 950 cubic inches and rotates at 2500 rpm. This produces 350 horsepower in a package that's less than 57 inches long.

The V8-350 has many new features to reduce operating costs. New internal fuel and oil lines eliminate threaded connections, damage to exposed lines. Cummins own 12 cfm air compressor is supplied on both engines. Of simple, one cylinder design, here is the only unit in the trade backed by a 3600 hour or one year warranty.

Another practical advantage of the V8 Diesels is the 2500 rpm. This gives you an ideal relationship of horsepower, torque and speed to permit the use of lighter, more compact, less costly transmissions. In other words, your initial investment is reduced as well as the maintenance cost during operating life.

Cummins exclusive PT fuel system also reduces maintenance and fuel costs. It operates on lower priced No. 2 diesel fuel . . . has fewer parts than any other diesel fuel system. The pump is mounted in the 90° angle formed by the cylinder banks. Also possible, on the V8-350 . . . either the intake or exhaust manifold can be placed inside the "V" to fit your application requirements.

Get the complete profit-making story on these new compact V diesels, and on the models in which they are available, from your nearest construction equipment representative or Cummins Distributor.




Ratings corrected to conditions of 29.92" hg (sea level) barometric pressure; 60° F intake air temp.

## WHAT YOU SHOULD KNOW ABOUT THE NEW LABOR LAW

*continued from page 144*

themselves badgered by unions to sign much more free-wheeling contracts under the terms of this exception. This is, of course, a form of closed shop.

Definitions of the Act are vague, and courts probably will have to determine who or what is meant by the "building and construction industry." Until that time, rock industry representatives should not permit themselves to be blackjacked by this clause in the new labor Act.

**The new law imposes** on employers several duties and responsibilities in addition to, or in modification of, those incorporated in the Taft-Hartley Act. As before, it is a criminal offense for employers to make under-the-table payments to any union representative. But this provision has been spelled out more carefully to include also:

—Payments made by associations of employers or consultants acting for an employer;

—Payment to any group of employes "in excess of normal compensation" to cause them to influence other employes (except for employes such as industrial relations directors whose duties are to act openly for the employer);

—Loaning money to union officials.

Any such payments that are made must be reported to the Secretary of Labor within 90 days of the end of the fiscal year. Obviously, such a report would represent virtual admission of an improper payment—except in grey areas where there is doubt of propriety or legality. Such payments probably should be reported if only to obtain a ruling and protect the employer from possible criminal action for failure to report. This section of the law should be studied with particular care by every rock producer and his legal counsel.

The foregoing is a highly condensed, skeletal outline of some of the major changes contained in the new labor law. Every rock producer should obtain a copy through the Government Printing Office in Washington. Provisions of particular interest should be carefully studied and, if the situation warrants, referred to legal counsel. There will be many problems of interpretation of this law in our courts over the next few years—resulting in changes you should know about. This is one area in which ROCK PRODUCTS will attempt to keep its readers fully informed.

**In the meantime, what should you do** if you feel your rights under the new labor act have been violated—after careful study of its provisions and consulting with legal counsel?

1. Contact your Regional National Labor Relations Board office. This must be done within six months of the violation. You then will be asked to fill out a written charge of particulars.

2. An NLRB field examiner will investigate and report to the regional director. He can do one of three things:

—Refuse to issue a complaint because he feels you don't have a case. This can be appealed within 10 days to the NLRB General Counsel who has final authority over the appeal;

—Try to arrange a settlement agreement through the union and avoid filing formal charges;

—Issue a complaint, notice of hearing, and possibly request a court injunction against the union.

3. A trial examiner will hear the case and recommend to the NLRB whatever action he feels is justified, making public his report.

4. If no exceptions to the report are filed, it becomes the order of the NLRB. If an exception is filed (and this happens about 80 percent of the time) it must be done within 20 days of the examiner's report.

5. The NLRB—or, under the new law, an appropriate state court—will decide the case through consideration of the hearing transcript and the examiner's report.

Many experts feel that the most important single change wrought by the new law is the injection of federal law enforcement authorities into the labor area. Violators of the new law will have FBI agents on their trail—admittedly a much more effective deterrent than most local law enforcement agencies. It is expected that this will have a considerably sobering effect on free-wheeling union extortionists and goons—as well as dishonest management.

**As a result of the new labor law,** rock industry employers should take four minimal steps:

1. Acquaint themselves much more directly with internal operations of their union local. An employer should determine, for his own protection, whether or not the union with which he deals is operating internally within the law.

2. Review existing labor agreements in the light of the new provisions to see if any portions of current contracts are inoperable. *Turn to page 202*

*A flexible arrangement copes with 1,000 tph. of hard, abrasive rock—and easily converts to a commercial plant*

# Big gyratories lick trap rock problems

by Kneeland A. Godfrey, Jr.

WHEN THE $75-MILLION Dulles International Airport near Washington, D.C., is completed next year and turned over to jet traffic, a triumph over production difficulties will have been scored by the stone producer on the project. Chantilly (Va.) Crushed Stone will have done its job and will be able to turn profitably to other commercial production. The special-project, 900-tph. plant was planned that way.

In addition to its size, the crushed stone plant is outstanding in two respects: To cope with silica-rich diabase trap rock hard enough to break drop balls, it uses gyratory and cone crushers. Second, to make stabilized base material and three grades of concrete and asphalt aggregate on the current job, and be adaptable to future demands, it features a team of truck bins, blending belts and a tunnel-reclaim belt.

Requiring 1.3 million tons of crushed stone, the airport will be one of the country's largest and busiest when it opens in Spring, 1961. To give an idea of the size of this project, C. J. Langenfelder & Son, contractor on the job, reports that about 11 million-cu. yd. of earth were moved at the 9,000-acre project. Three runways are being built—two, 11,500 ft. long and one, 10,000 ft. All are 150 ft. wide, with concrete 12 to 15 in. thick.

To add to the requirements for material, 25-ft. wide asphalt shoulders are being laid along both sides of each runway. To insure adequate bearing strength, a 9-in. layer of stabilized base material was specified under runways, shoulders and taxiways. Paving started last year, will be completed this summer. In all, with its earthmoving and paving jobs, Langenfelder holds contracts totaling $19 million. The huge airport will enable Washington to handle intercontinental jets for the first time.

Economical crushing was a major problem because the hard diabase trap rock contains about 50 percent of that abrasive pest, silica. Its compressive strength is an impressive 55,000 psi.

To meet the crushing challenge, three stages of gyratory and cone crushers are used. A 42-65 Superior gyratory with design capacity of 1,000 tph. handles quarry-run, breaking it down to minus 6 in. The next two stages are cone crushers. A 1784 cone breaks down 2 x 6-in. rock to minus 3½ in the second reduction; twin 751 cone crushers make the final reduction, typically breaking down the 1½ x 3½ fraction to minus ¾ in.

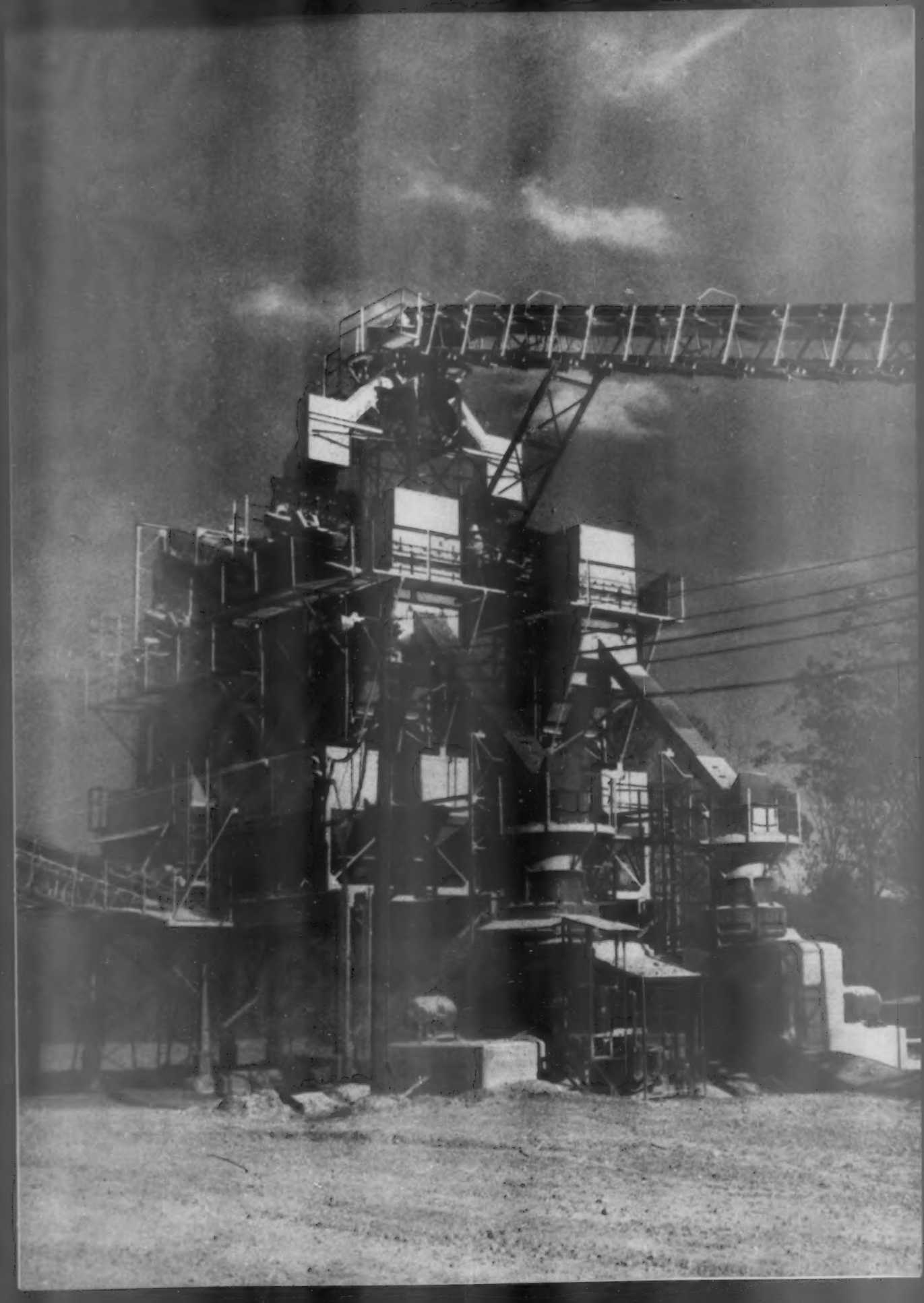
**The final-screen crush tower gives flexibility.** It is this tower whose bins, screens and blending belts permit making three sizes of concrete and asphalt aggregates, plus the stabilized base. Too, this tower later will permit easy conversion to commercial operation. Its four screens, eight truck and blending bins and three blending belts make this possible.

Here's an outline of the flow setup at the tower. (1) Two tertiary crushers, 751's, reduce top size to either 1½ or 2½ in.

(2) The rest of the 630 tph. reaching the tower

*Please turn to page 156*

FOUR FINISH SCREENS with truck-and-blending bins beneath, plus 3 blending belts and 2 cone crushers, give top flexibility to this final screening tower



# ROLLS OUT OF

**KON-TORK differential automatically applies power to the driving wheel with firmest footing . . . moves the 230-hp Allis-Chalmers TR-260 through the toughest going.**

In mud, sand or other slippery going, you can rely on the Allis-Chalmers TR-260 to move you out of trouble. KON-TORK differential automatically controls the amount of torque delivered to each driving wheel. When one wheel hits soft going, KON-TORK differential takes hold and transfers torque from the slipping wheel to the wheel with solid footing . . . keeps the 20-ton capacity TR-260 on-the-go. With KON-TORK differential, normal and complete steering control is available at all times.

KON-TORK differential is just one of many features you'll like in the TR-260. You'll also appreciate the *21-inch underclearance at the tractor*, and *25¾-inch wagon*

**. . . move ahead with**

# TROUBLE

KON-TORK is an Allis-Chalmers trademark.

*underclearance* that prevents hang-ups in rough terrain, and the *really sharp 180-degree turns in less than 26½ feet* . . . unmatched by conventional haulers.

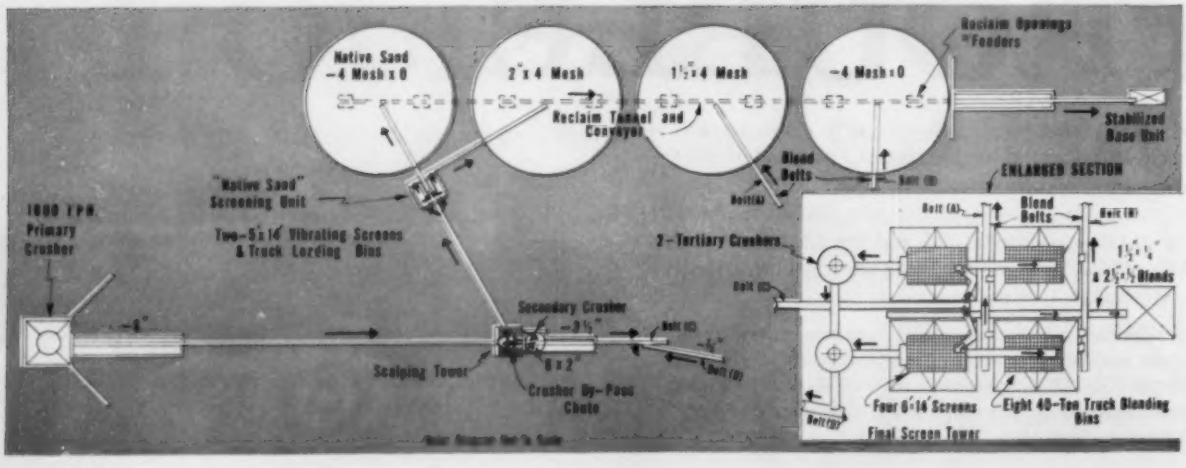
Let your Allis-Chalmers dealer give you all the facts on the 20-ton capacity TR-260 and the 12-ton capacity TR-160. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

*You get double value and lower basic equipment investment when you use the 9.5-cu-yd TS-160 and 17-cu-yd TS-260, the 12-ton TR-160 and 20-ton capacity TR-260. Both can be interchanged . . . together they eliminate need for specialized equipment.*

**ALLIS-CHALMERS . . . power for a growing world**

OPERATOR OF THIS ORANGE-PEEL GRAPPLE, plus a second man signaling to control dump rate, insure that the busy primary gyratory doesn't get "indigestion" as it chews up 900 tph. of diabase trap rock

LEFT: Four big shovels and 11 rear-dumps were working to move 900 tph. to the Chantilly Crushed Stone primary. Dozer smooths floor around shovel, speeding work



*continued from page 153*

passes through two pairs of triple-deck, 6 x 14-ft. screens. On reaching the tower, minus 3½-in. stone hits the first pair. Mounting 2½, 2 and 1½-in. wire cloth, the screens typically shunt plus 1½-in. to the Hydroset cones. (Some of the 2 x 2½ and the 1½ x 2-in. fractions required in making a ½ x 2½-in. concrete aggregate drop to bins beneath the screens.)

Minus 1½-in. throughs move directly to the second pair of vibrators that mount 1, ½ and 3/16-in. cloth. The four fractions made on these two busy screens drop to four bins beneath.

(3) Now comes the interesting part of the tower's design, which lends it flexibility. Note, in the accompanying drawing, the three blending conveyors running beside the eight 40-ton bins in the final screen crush-tower. Conveyor No. 1 blends the ¼ x ½, 1 x 1 and 1 x 1½-in. fractions, carrying the ¼ x 1½-in. mix to a stationary stacker. Discharged over a reclaim tunnel, this stacker's pile of stone is one of four later blended to make the 800,000 tons of stabilized base material specified for the project's six miles of runways.

Next, check blending conveyor No. 2. It picks up minus ¼-in. fines, and carries them to another of the four stabilized-base stockpiles.

Now comes a blending belt for concrete and asphalt materials. To get clean, all-crushed aggregates, Chantilly Crushed Stone uses blending belt No. 3, running from left to right through the complex of eight bins. With a chute leading from each bin, it's an easy job for the operator to make any blend needed. Usual blends are ¼ x 1 and ½ x 2½-in. concrete aggregates. Whichever blend is needed, it is carried to a ninth bin, the "blending bin," set off to the side of the tower. This is a truck-loading bin (as are the other eight) and was shipping up to 5,000 tons per day during the busy season last summer.

Langenfelder had 26 tandem rear-dumps carrying this material, plus about an equal amount of stabilized base each day. Distance to the ready-mix plant and runways: an average of three miles.

**About 5,500 tpd. of stabilized-base mix was used** on the runways. A twin-shaft 600-tph. pugmill (9 x 14-ft.) mixed six percent water in with the dry material, permitting maximum compaction on the grade.

The stabilized-base blending operation is interesting because of its high efficiency and because of its low labor requirements.

A 35-ft. layer of overburden comprised largely of native sand lay atop the needed diabase. Since specs for stabilized base permitted up to 15 percent such material, the producer used it. In that way he cut crushing costs and minimized a waste-material stockpiling problem at the same time. About 120,000 tons of this sand went into the base.

Stripped by shovel and truck, the sand was simply dumped into the primary along with blasted rock. At the primary screens, all minus 2-in. material was chuted off to one side to a native sand screening unit. Here, twin 5 x 14-ft., single-deck Ty-Rocks made a separation at ¼ in. Both oversize and minus ¼-in. sand, carried by two stationary stackers, moved to the final two stockpiles over the reclaim tunnel. Thus Chantilly got its four piles of material for making stabilized base—minus ¼-in. native sand, ¼ x 2-in. dirty stone, ¼ x 1½-in. all-crushed stone, and minus ¼-in. all-crushed fines.

Low labor cost is important to producers, and this one achieved it in the stabilized-base operation. Fed by vibrating feeders controlled from one spot, the base mix was blended on the reclaim belt and carried to the pugmill. Actually, a man at the native-sand screening station and the pugmill operator were the only two men required. Without a reclaim-tunnel system or other automatic blending setup, the rehandling cost would have been high.

Here are the specs met by the base material blended from the four stockpiles:

Stabilized base material

| Size | Percent passing | Size | Percent passing |
|---|---|---|---|
| 2 in. | 100 | ¼ in. | 30-60 |
| 1 | 55-85 | 40 mesh | 10-25 |
| ¾ | 50-80 | 200 mesh | 3-10 |

**"Impressive" is the word for the entire operation,** from drilling to finished stone. Starting at the quarry, the 900-tph. plant (output has hit up to 1,400 tph.) worked with two weekly blasts of about 25,000 tons apiece. The contract driller on the job used three Drillmasters mounting 5-in. downhole bits. Putting down 35-ft. holes, the rigs spaced their hole pattern at 10 x 10 ft.

Secondary breaking was done with a 6,500-lb. drop ball on a ¾-cu. yd., carrier-mounted crane. As noted earlier, this is a very hard job because of the rock's hard, tough nature. But ball breakage was finally licked when the right steel formula and weight of ball were found.

About 4 ft. of earth and 25 to 30 ft. of sand overburden were removed by shovel and trucks.

*Please turn page*

## BIG GYRATORIES LICK TRAP ROCK PROBLEMS

*continued from page 157*

Some of the sand, as mentioned above, was utilized as part of the 800,000 tons of the stabilized base required.

Four shovels worked the shot rock much of the time, three 2½-cu. yd. units and one of 1¾-cu. yd. capacity. Working at four separate faces, they fed 11 rear dumps which carried an average of 27 tons. The run was short, since the plant is alongside the quarry.

The primary operation is interesting, since it exemplifies the close attention producers pay to insuring nonstop production. Two men oversee the crusher. The first, sitting at hopper's edge behind a heavy wire screen, gives hand signals to the truck drivers, two trucks can dump at once. This closely controls dump rate of rock and makes sure that the choke-fed gyratory is fed evenly and at capacity.

The second man operates an "orange-peel" grapple. His job is to unsnag jams and to see that the largest chunks are fed to the 42-in. crushing chamber at the best angle.

These are Chantilly Crushed Stone's four processing stations: primary crusher and three screening towers. It's a modest number, considering the plant's 900-tph. capacity and its ability to make three sizes of concrete and asphalt aggregates, plus stabilized base.

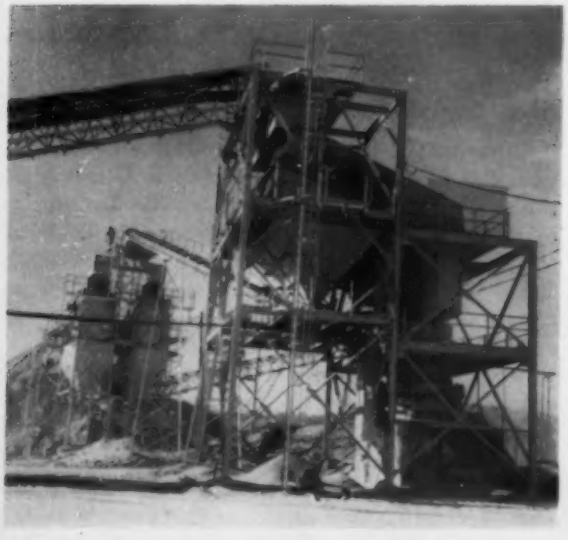
**Easy conversion to commercial production** is a feature designed into this special-contract plant. The four blending belts (one in the tunnel) are the key here. Once the airport contract is completed this year, the four belts can be used to make any needed size—from concrete rock to base material and driveway stone.

Of course, the nine bins (for both blending and truck loading) are the second key to successful large-scale commercial production. From a bin or the reclaim tunnel, any individual size can be pulled out when special orders are received. Already, trucks are stockpiling certain sizes for use at the runways and for sale commercially.

With commercial production, and as stone near the surface is consumed, the quarry face will deepen from 35 ft. to perhaps 50 or 60 ft. But even this is only scratching the surface—the stone deposit extends down at least 200 ft.

Actual plant design and structural steel work were handled by L. B. Smith Co., Camp Hill (Harrisburg), Pa., the big fabricator and equipment distributor.

Among key operating personnel at the Chantilly Crushed Stone operation are Fred T. Nelson, project manager; Edward Purcell, general superintendent, and Deal Ettl, engineer. Bill Hazelhurst is over-all manager of the Dulles Airport work for Langenfelder. **END**



NATIVE SAND, an overburden material, is scalped out here and sent to screens in background. Secondary crusher reduces 6-in. rock to minus 3½ in.

MAJOR EQUIPMENT REFERENCE

IN THE QUARRY

| | |
|---|---|
| Drills, Drillmaster (3) 5-in. Downhole bits | Ingersoll-Rand Co. |
| Drop ball, 6,500-lb. | Cape Ann Anchor & Forge Works |
| Crane, ¾-cu. yd. | Thew Shovel Co. |
| Shovels | |
| 2½-cu. yd. model 80D (3) | Northwest Engineering Co. |
| 1¾-cu. yd. model 38B | Northwest Engineering Co. |
| Trucks, rear dump (11) | Euclid Division, GMC |

AT THE PRIMARY CRUSHER

| | |
|---|---|
| Primary crusher, 4265 Superior gyratory | Allis-Chalmers Mfg. Co. |
| Grapple on ¾-cu. yd. wheel crane | Northwest Engineering Co. |

AT SCALPING TOWER

| | |
|---|---|
| Scalping screens, 6 x 14-ft. (2) | W. S. Tyler Co. |
| Secondary crusher, 1784 Hydrocone | Allis-Chalmers Mfg. Co. |

AT NATIVE SAND SCREENING UNIT

| | |
|---|---|
| Screens, 5 x 14-ft. (2) | W. S. Tyler Co. |

AT FINAL SCREEN-CRUSHER TOWER

| | |
|---|---|
| Screens, 6 x 14-ft. (4) | W. S. Tyler Co. |
| Tertiary crushers, 751 Hydrocones (2) | Allis-Chalmers Mfg. Co. |
| Truck-load bins (9) | L. B. Smith Inc. |

OTHER

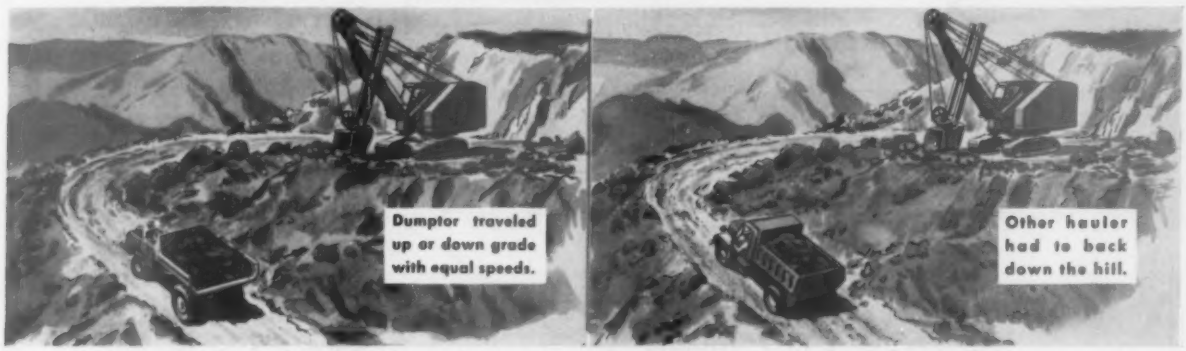
| | |
|---|---|
| Conveyors, other structural | L. B. Smith Inc. |
| Contract drilling | York (Pa.) Drilling Co. |
| Vibrating feeders | Syntron Co. |
| Pugmill, 9 x 14-ft. | Iowa Mfg. Co. |

# TIMED TO PROVE FASTER HAULING

On the job described here, a 15-ton Koehring 100 Dumptor was matched against another leading rear-dump hauling unit. The Dumptor out hauled its competition by an amazing margin — actual time studies (see table) showed the Dumptor making almost twice as many round trips! Why the big difference? One reason was that the competitive hauler had to back down the grade — as one observer said, "You could smell the brakes burning".

Check out the 100 Dumptor in your own operation. Here's a 30,000 lb. payload machine with a big 10' x 10'-9" body. Instantaneous or controlled dumping. No turn operation. Full speed in both directions. Hydraulic clutches for direction and speed range selection combine with torque converter drive and power-steering for maximum operating ease and speed. Your Koehring distributor has all the facts. Call him for a demonstration.

| HAUL UNIT | HAUL TIME | | | DUMP TIME | | | RETURN TIME | | | AVERAGE TRIP |
|---|---|---|---|---|---|---|---|---|---|---|
| TYPICAL TRIPS | #1 | #2 | #3 | #1 | #2 | #3 | #1 | #2 | #3 | |
| 15 TON DUMPTOR | :48 | :53 | :49 | :07 | :06 | :04 | :37 | :43 | :48 | 1 min. 38 sec. |
| 18 TON REAR DUMP HAULER | 1:25 | 2:00 | 1:53 | :14 | :16 | :17 | 1:12 | 1:09 | 1:14 | 3 min. 13 sec. |



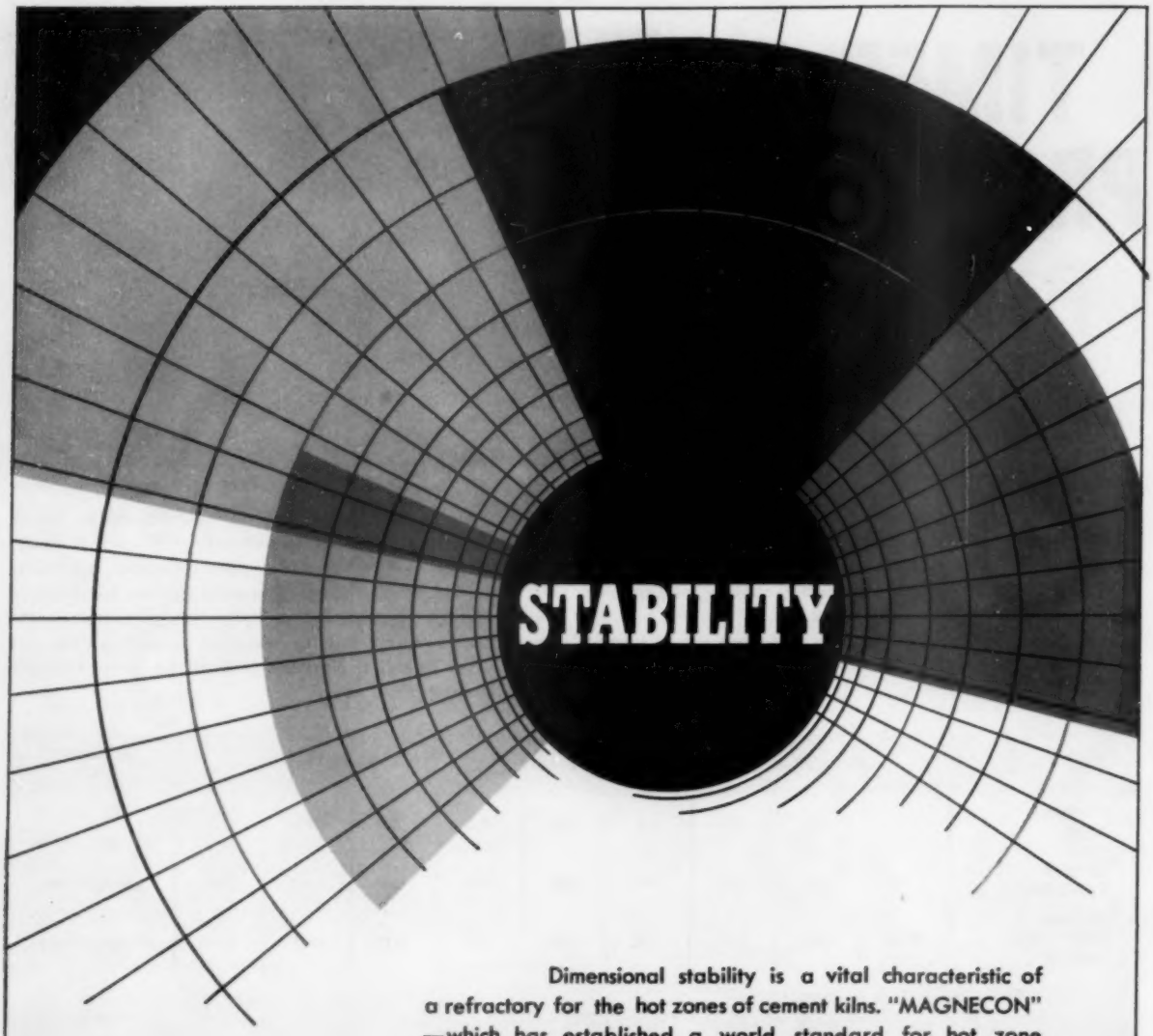

Test of Dumptor vs. rear dump hauling unit on job covering 603 feet total one-way haul with 204 feet of total distance on a 20% grade.

KOEHRING
DIVISION OF KOEHRING COMPANY
Milwaukee 16, Wisconsin

MODEL 100
15 TON DUMPTOR

K71

*Enter 1133 on Reader Card*




Dimensional stability is a vital characteristic of a refractory for the hot zones of cement kilns. "MAGNECON" —which has established a world standard for hot zone liners—has very high dimensional stability. "MAGNECON" was the refractory selected for seven of the largest cement kilns in the world, all newly completed or still a-building:

Miron Freres, Montreal, Que.
Kiln 550′ x 15′ diameter

Ciments d'Obourg, Obourg, Belgium
Kiln 525′ x 15′ 7″ diameter
Kiln 525′ x 14′ 7″ diameter

Dundee Cement Co., Dundee, Michigan
2 kilns 460′ x 16′ 6″—15′
—16′ 6″ diameter

Ciments Liegeois, Harcourt, Belgium
Kiln 475′ x 13′ diameter
Kiln 510′ x 14′ 5″ diameter

REFRACTORIES

**CANADIAN REFRACTORIES LIMITED**
CANADA CEMENT BUILDING, MONTREAL, CANADA

1908

*Enter 1078 on Reader Card*

# Here's a new approach to portland cement

by A. D. Stephenson*

EMPHASIS IS ON GRINDING in a new approach to cement specifications that, since April 1958, has met with marked success in Ontario. Following the idea that particles sizes hold the clue to variations in portland cement behavior, I arrived at a method to insure that they show a normal distribution curve. Research led the way to an increase in surface area (Blaine), a wider and controlled range of particles sizes and, consequently, to a cement of uniformly desirable qualities.

Producers who adopt this procedure can expect these results: Water retention is increased by five percent. Plasticity improves both quantitatively and qualitatively; there is sufficient plasticity for longer forming periods, and the concrete still is rigid enough to be handled and to remain monolithic in structure. There is increased temperature stability. Where moisture content is critical, improved strength is obtained, due to increased water retention.

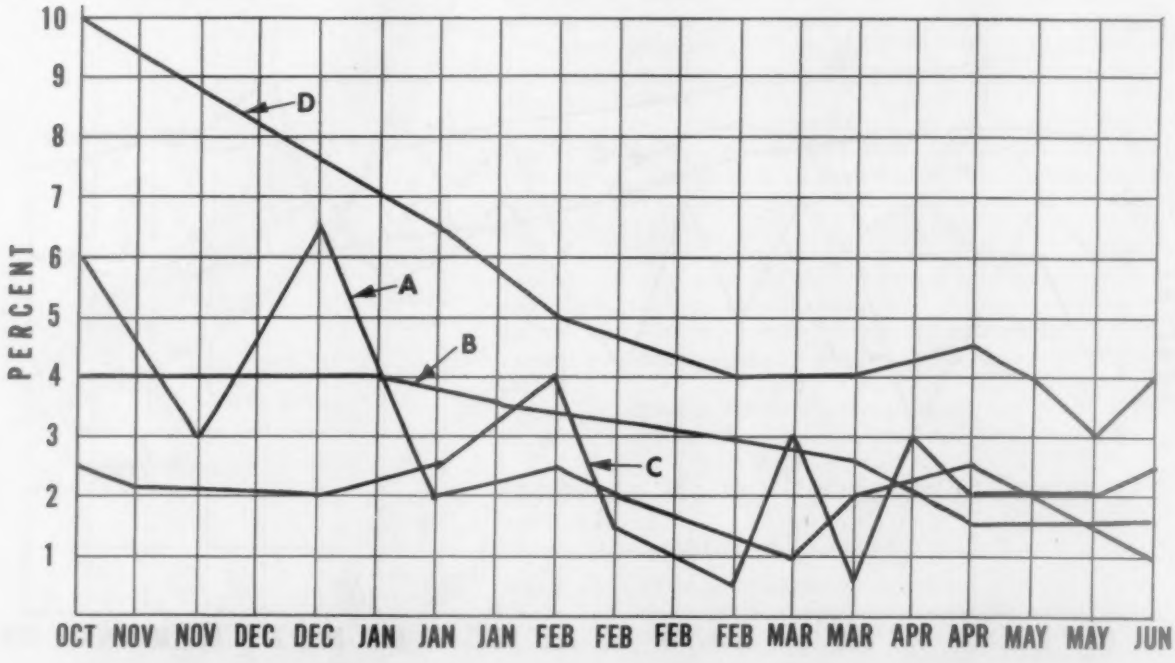
Contrast the above qualities with cements of ap-

*Please turn to page 162*

*Fellow of the Royal Institute of Chemistry (Great Britain and Ireland) and Member of the Canadian Institute of Chemistry. Mr. Stephenson now is associated with Canadian Johns-Manville Ltd.

*The work described in this paper was done in connection with the asbestos cement products of Canadian Johns-Manville Ltd., with the cooperation of Lake Ontario Portland Cement Co. and St. Mary's Cement Co.*

FIG. 1—Percent variations of plus 200 mesh of four brand-name cements



## HERE'S A NEW APPROACH TO PORTLAND CEMENT

*continued from page 161*

parent uniformity that exhibit marked differences in behavior. For example, they vary in quantity and duration of plasticity, workability and degree and extent of water retention. Other variables are noticed in the forming and setting-up stages of concreting. This is true even where ASTM definitions, standards and methods of testing are accepted and cements meet these requirements.

In 1957, research to eliminate these variables began. A simple sieve analysis was sufficient to show that the fundamental difference in apparently similar cements that accounts for their varying behavior lay in their particle-size distribution. In the following analysis, the 200 and 325-mesh screens were used.

Figures 1 and 2, respectively, indicate the variations on these screens of four well-known brands of cement over a 10-month period. This was when most Canadian Type 1 portland cements averaged 2,850 Blaine. To the consumer the only recorded difference between the cements might have been in price. When analyzed on the testing sieve shaker they gave: plus 200, .5 to 1 percent; plus 325, 6 to 8 percent; Pan, 91 to 93 percent.

This sieve analysis is represented roughly by the particle-size distribution curve A (Fig. 3). Curve B represents a cement whose behavior

*Please turn to page 204*

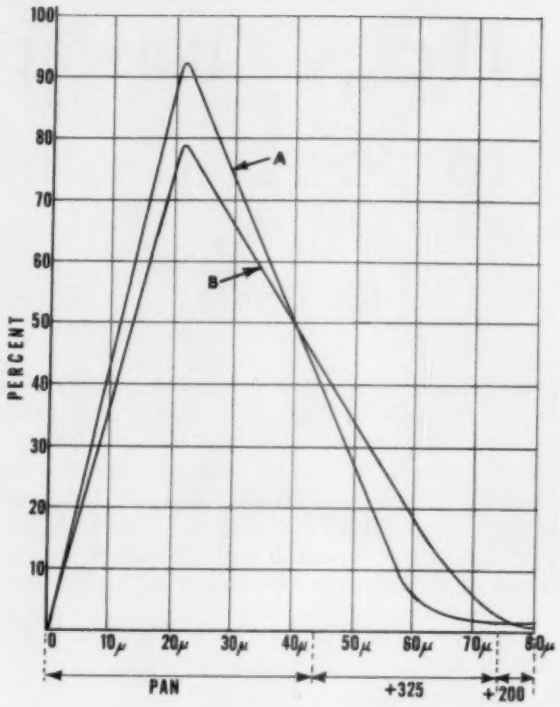
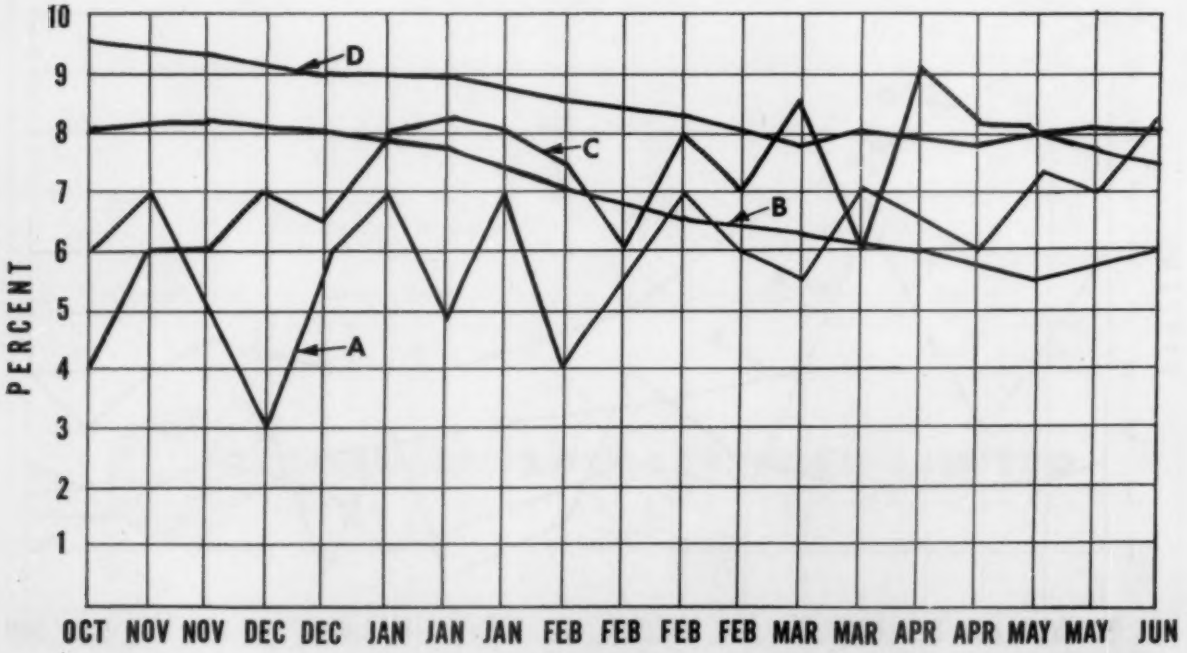
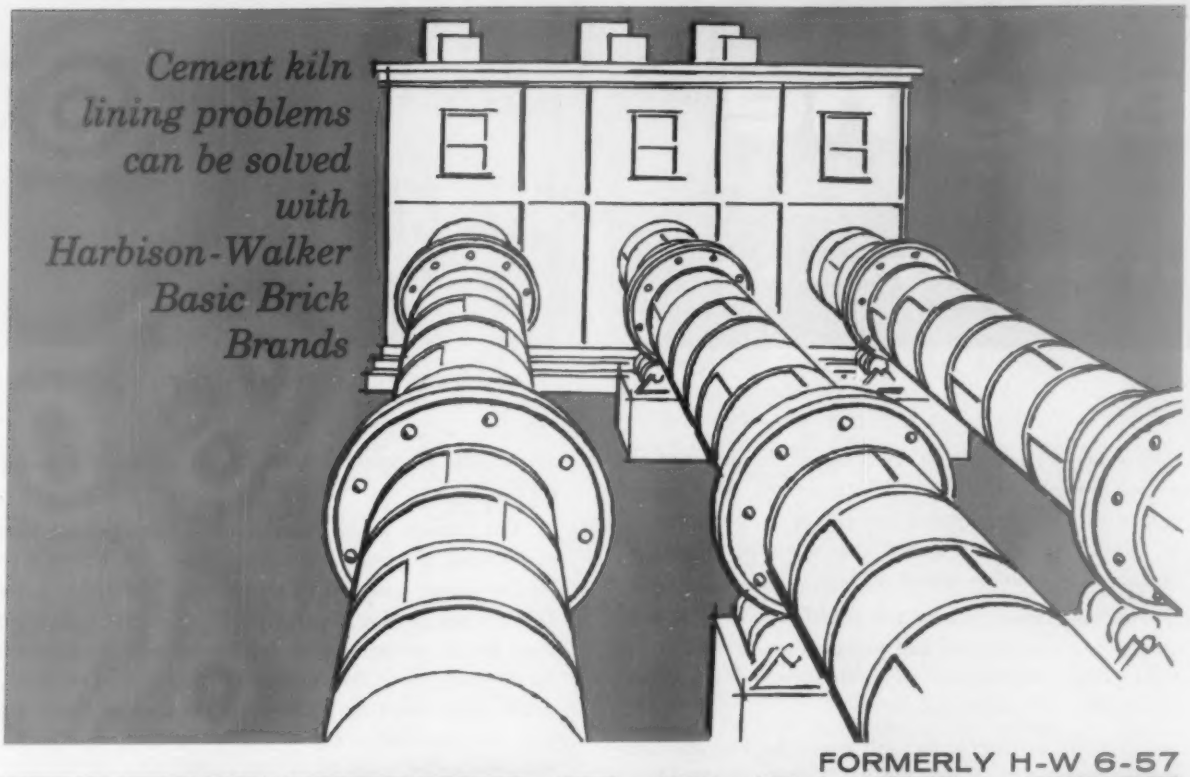



FIG. 3—Particle-size distribution curve A roughly represents sieve analysis of four cements tested; curve B represents a cement whose behavior pattern proved more successful in use than all other available cements

FIG. 2—Percent variations of plus 325 mesh of four brand-name cements

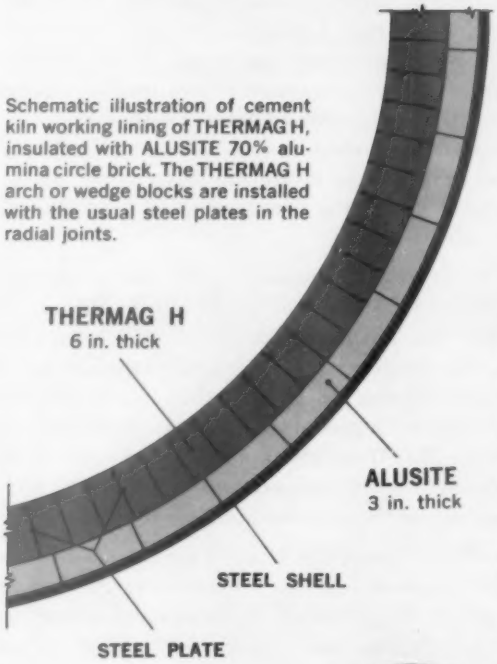


*Cement kiln lining problems can be solved with Harbison-Walker Basic Brick Brands*



FORMERLY H-W 6-57

# THERMAG-H




Schematic illustration of cement kiln working lining of THERMAG H, insulated with ALUSITE 70% alumina circle brick. The THERMAG H arch or wedge blocks are installed with the usual steel plates in the radial joints.

Whatever may be the normal burning zone lining life, established as months or even a year and longer there remains the incentive to prolong the service and increase efficiency. The high temperature zone generally is the most vulnerable and radiates most lost heat. The many operating variables necessitate the use of the particular types of basic refractories best adapted for a given set of conditions in order to assure best economy. For the development of a protective and insulating coating of optimum thickness, the basic brick composition and softening point need to be compatible with these properties of the cement clinker produced.

Among the various different classes of Harbison-Walker basic refractories regularly used with good economy in rotary kiln linings, THERMAG H (formerly H-W 6-57) merits special consideration for unusually severe conditions. This duo-spinel bonded basic refractory of very hard burn is solving some difficult service life problems. In some kilns which are operated at exceedingly high temperatures, linings of this brand are insulated with ALUSITE 70% alumina brick and service is not impaired. The refractoriness of THERMAG H is adequate for maintaining a moderate coating which also adds to the overall insulation.

For conditions under which lining life at best is short, this unusual basic refractory warrants your investigation.

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# engine power
BY CATERPILLAR

# FACTS ON REPOWERING WITH CAT ENGINES

Obsolescence has a way of creeping up almost unnoticed on equipment like industrial locomotives. One reason is that you buy equipment like this with long-term use in mind. So long as it performs reasonably well, an industrial locomotive seems ageless.

Yet, age does take its toll in efficiency. The locomotive needs more care and parts. It's slower on round trips. Down time occurs more frequently. It just isn't as reliable as it once was.

In some instances, the job grows beyond the locomotive's capacity. When the job is just slightly bigger than the engine, it's economically hard to warrant the cost of a new unit to get ahead. Many owners of industrial locomotives have found an answer to the age problem that's economically sound and sensible, too, from the production standpoint. They've simply repowered with Caterpillar Diesel Engines. For a modest investment—compared to costly maintenance or to buying a new locomotive—they now have locomotives that perform better than new.

A sand and gravel producer repowered a Plymouth locomotive with a Cat D337 and was able to do away with a steam locomotive he purchased from scrap to keep materials moving. The repowered 45-ton engine, reports the company, can break away and haul greater tonnage than the 60-ton steam locomotive. When the Plymouth had an air-operated clutch (direct drive), it was a major headache . . . big loads were clutching and declutching nightmares. Clutches wore out fast. Engine repairs were high and even the rails wore out rapidly. Efficiency was low.

In another instance, the owner of a 25-ton locomotive crane replaced a gasoline engine with a Caterpillar Diesel. This changeover has proved to be a very practical installation. Power and economy are good. In addition, the simplicity of the installation and the low cost of the changeover were added advantages gained by this owner.

Cat Diesels prove themselves in changeovers from every kind of power—including steam. A 15-ton locomotive crane, powered by steam, was changed to a Cat D315 with Torque Converter. The engine has more than ample power reserve for work—and the power is far smoother than that obtained with steam. The crane's work output shot up 33%—and the cost of diesel fuel is a small fraction of the cost of boiler fuel. And no fireman is needed with the diesel installation.

We could cite an almost endless list of examples. In each case, the equipment owner made the changeover on the basis of careful evaluation of every repowering aspect. In every case, Caterpillar Diesel Engines proved to be the best repowering investment. Post-installation performance justifies the choice down the line. Output goes up. Operating costs go down. Costly maintenance vanishes and dependability rises to new highs. And all of this comes with an investment that's only a fraction of that for purchasing new equipment to replace the entire unit.

When you think of repowering, be sure to have your Caterpillar Dealer give you his recommendations. He probably has repowered locomotives or cranes like yours. He can give you a clear idea of the cost and of the results you can expect. Probably, too, he can show you how to save a good deal of money. He has dependable Caterpillar Diesel Engines from 50 to over 700 HP, in a choice of many configurations. He is able to match the engine and transmission precisely to your need.

Send for "Caterpillar Engines for Railroad Power" and for "Railroad Equipment Manufacturer's Machines Powered by Cat Diesels." Each contains power data that can help you work out the best answer to your engine needs. Send for these today.

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Engine Division, Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

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*West Des Moines Sand & Gravel Co. upgrades gravels with modest investment and lower operating cost*

# Small feeder proves big boost to jig efficiency

by Kneeland A. Godfrey, Jr.

ROBERT FISHER, owner of the West Des Moines Sand and Gravel Co., is proud of his new jig because it does a good beneficiating job at moderate cost. But a second feature of his installation makes him even happier. It seems he was the first to come up with the idea of using a vibrating feeder for charging the jig.

This Iowa producer uses a Remer (diaphragm-type) jig to process 40 to 45 tph. of buckshot and concrete gravel. As a beneficiating device it replaces a log washer that did a good job of breaking down the soft coal lumps and in loosening dirt from the gravel. But with the washer, as many as three men were needed to pick out the coal lumps and sticks when heavy concentrations were encountered.

Too much was spent for labor. But no more. The jig, fed by the vibrating feeder, eliminates the need for pickers and does a far better job than they ever could in guaranteeing clean, sound gravel.

The log washer is still a useful item in the process flow, however, in dewatering the gravel ahead of the jig. (Later, more water is measured out precisely when the gravel enters the jig.) To insure a clean product, Owner Fisher washes the gravel a third time—as it passes over a vibrating screen set last in the process flow.

The electromagnetic vibrator is really what makes the installation a complete success, Mr. Fisher notes. Reason: Feed rate must be perfectly constant for best results, and the feed should be spread out across the jig's bed in an even, thin layer. Previous feeders hadn't done this job, even with an operator watching full time. Surges in the feed rate and a thicker "ribbon" of feed had cut into the jig's potential efficiency.

Today, the vibrating feeder is spreading the feed in a thin layer, so the jig's pulsating action separates all gravel particles effectively. Too, feed rate must be closely controlled, so it will jibe with the feed rate of water. The vibrator does this, too. The result: Operator Gary Allard has extra time left after checking the jig occasionally. He now can watch several nearby bucket elevators and two crushers as well.

As proof of the jig's effectiveness using the vibrating feeder, Mr. Fisher reports that the unit's

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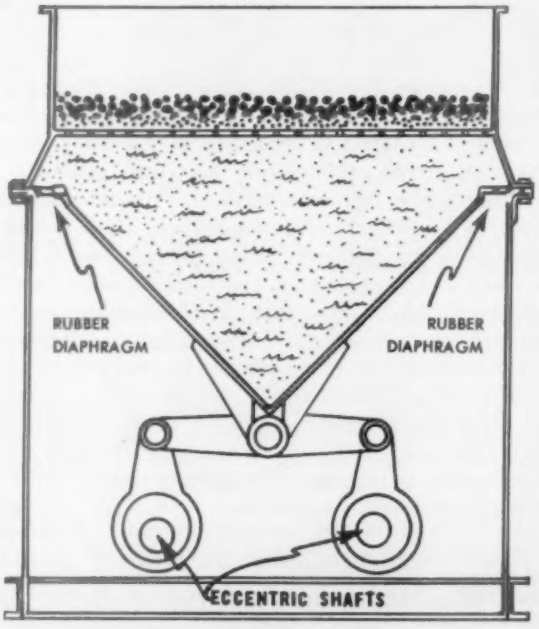


CROSS-SECTION from the end of the jig shows rubber diaphragm and the two eccentric shafts. Note that the one on the left has greater eccentricity than the other

## SMALL FEEDER PROVES BIG BOOST TO JIG EFFICIENCY

*continued from page 165*

OPERATOR GARY ALLARD, standing at the head end of the jig, watches vibrating feeder do its job. Feeder insures "ribbon" flow of feed, eliminates most surges

maker now recommends such a feeder with similar new installations.

Here's how the jig operates: The 5 x 16-ft. jig separates unwanted particles from sound gravel by taking advantage of their weight differences (as do most beneficiating units). But this type of jig is different—its charge of pulsating water is "jigged" by an oscillating hutch which forms the bottom of the unit. It is attached to the jig's sides by a flexible rubber diaphragm. Two eccentric shafts give the steel hutch its pulsation.

Here are the engineering specifications for the unit: Size—5 x 16-ft. bed. Capacity as used—40-45 tph. Size of feed—1¼ x ¼-in. gravel. Beneficiating characteristics — deleterious in feed, about two percent coal, one percent shale. Deleterious in product, about .03 percent coal, .12 percent shale. Output tonnage—37-43 tph. sound gravel, 2-3 tph. reject. Water used—500 gpm. at 25 psi. (makeup water in hutch).

This jig has an interesting feature not found on other jigs. This is the use of two eccentrics activating the hutch, instead of the usual one. Each works at a different frequency and also gives a different length of pulsing stroke. This "differential acceleration" is said to eliminate dead spots and disruptive turbulence, making the whole bed active in separating sound from lightweight particles. The feature, too, is said to permit a longer useful bed, which means a better chance of complete stratification of sound particles from unsound particles.

**How does this jig compare** with others in cost per ton, efficiency and other factors? Here are some of the answers:

First, direct operating costs are reportedly very low—on the order of 5 to 8¢ per ton of material treated. This is considerably lower than reported for most other beneficiators. However, the overall cost advantage is not really this great. Even though the jig itself is definitely lower in first cost than many competing units, it sometimes needs accessory equipment—such as a vibrating feeder and water metering equipment, plus dewatering screw classifiers, when sand is treated.

Second, the Remer jig can successfully treat a wider size range of sand and gravel than other beneficiators They are successfully working in materials ranging from 1¼ in. down to 100-mesh and finer. However, for best results a split is usually made and the two fractions are processed separately. The large fraction may be 1¼ x ¼ in., and the small, up to ⅞ in. x 0. The Remer jig is reportedly the only unit presently made which successfully beneficiates sand alone.

However, to give a balanced picture, two limitations of the jig must be noted. First it cannot make as precise a "cut" between heavy and the lighter, unsound particles as can other processes. A greater gap in specific gravity between the two grades of material is necessary to prevent "stray material" from getting into the wrong grade.

Second, the jig requires close attention, closer than do several other beneficiators. The operator must watch variations in feed rate, pressure and amount of bottom water, and relative percentages of sound and unsound particles. Variations in any are serious and affect efficiency. So the operator must be adept in correcting for the variations.

That's the story of the Remer jig and its success at West Des Moines Sand and Gravel Co. Thanks to its relatively low per-ton cost and efficiency, the firm is able to guarantee customers with a quality concrete and block aggregate. END

MAJOR EQUIPMENT REFERENCE

Remer jig, 5 x 16-ft. ..... Western Machinery Co.
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*High water, strange building codes put advanced electrical theories to test*

# Lehigh's Miami plant highlights advanced theories

by John F. Hower* & Anthony C. Lordi†

THE LATEST THINKING and most of the features of an excellent electrical system for any industrial plant are embodied in the Miami plant of Lehigh Portland Cement Co. Opened in the summer of 1958, the plant incorporates many advanced theories, some of which Lehigh pioneered. This is true of the electrical as well as the mechanical aspects of the installation.

Electrical features that distinguish this plant from older operations will be discussed in this and following issues of ROCK PRODUCTS. Chiefly, they include the purchase of power from a public utility; the outdoor location of the plant substation; the placement of indoor power centers in clean, pressurized rooms, and the underground distribution of main power and control feeders in a specially-constructed duct system.

This 2.5-million-bbl. plant, located in the swampy Everglades near Miami, had to cope with a problem peculiar to its area—water seepage that could damage an underground electrical distribution system. Prime considerations in the choice of distribution equipment were reliability, safety, maintenance and cost. We will explain these factors as they influenced the choice and design of the outdoor substation, its metalclad switchgear, cables, power centers, quarry distribution and metering.

In depending on a public utility for its electrical energy requirements, Lehigh followed the trend among cement plants not to generate their own power. Utility power is desirable from the standpoint of voltage regulation and reliability. The

*Please turn to page 170*

*Chief Electrical Engineer, Lehigh Portland Cement Co.
†Industrial Engineering Dept., Westinghouse Electric Corp.

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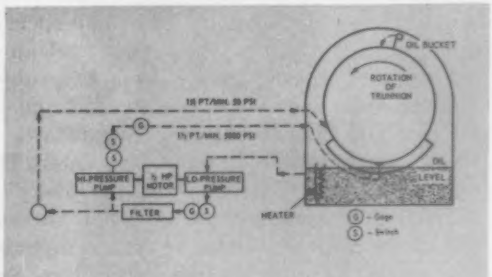


Diagram of LUBRITROL System

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## LEHIGH'S MIAMI PLANT HIGHLIGHTS ADVANCED THEORIES

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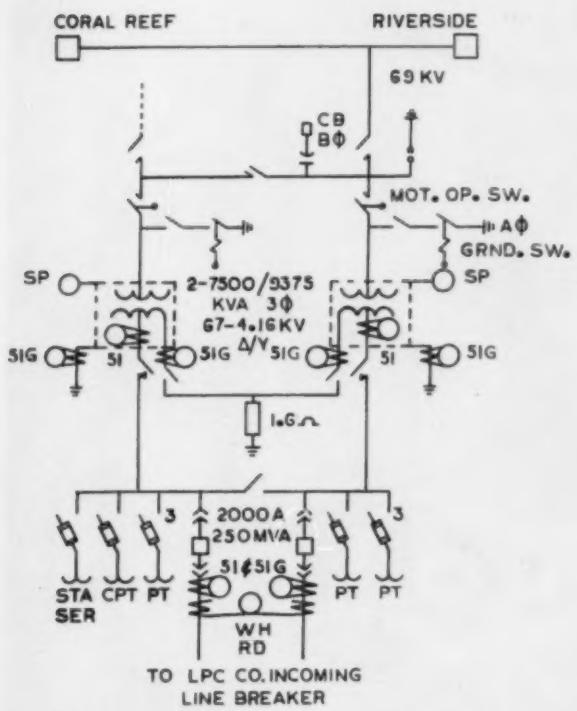


FIGURE 1—Power diagram of substation feeding Miami plant

large blocks of energy used by cement plants require delivery of power to the plant at transmission-line voltage; it must be stepped down for plant use at a substation.

The costly practice of locating cement plant substations indoors or under a roof has not been followed. Instead, they are placed on the windward side of the plant. To minimize flashovers and maintenance, a higher class of insulation level than normally would be required is used on exposed bushings and regulators. This increases the creepage path to the ground.

Florida Power & Light Co. (FP&L Co.), that supplies power to the plant, owns and operates the substation. In this way the Miami set-up differs from plants where Lehigh owns the substation. Wooden poles carry the effectively grounded 69-kv. incoming line to the east (windward) side of the plant where the substation is located. The normal short-circuit capacity of this 69-kv. bus is 385,000 kva. symmetrical. Another transmission line to the plant is planned to permit rapid restoration of service in event of a line failure. Switches and bus work required for this addition are contained in the present substation structure.

Circuit breakers are used instead of fuses to protect the substation apparatus on its high-voltage side because they allow the use of fast, sensitive relays and eliminate the single-phasing problem. Also, primary circuit breakers, by operating to isolate ground faults that may occur between the transformer's secondaries and the secondary breakers, can partially protect the distribution voltage side of the substation via relay action. These ground faults, when limited by a neutral grounding resistor, are not "seen" by primary fuses. If not removed, they may result in the failure at the grounding resistor.

The 69-kv. breakers protecting the Miami plant substation are remotely located at FP&L Co.'s switching stations. They are operated by a relay-

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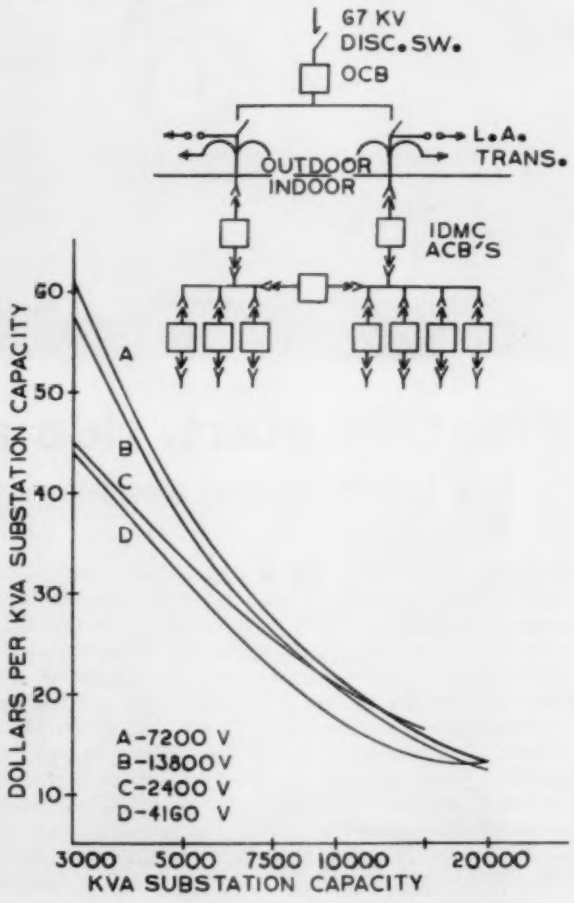
FIGURE 2—How the costs compare for double-ended substations of increasing capacities



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*continued from page 170*

ing and switching action in the substation. Here's how it works: Both of the substation power transformers are fed through gang motor-operated disconnect switches. To isolate a faulted half of the substation via the remotely controlled breakers, they operate as a team with spring-actuated grounding switches that tie to each of the transformers' 69-kv. feeds.

Normally, the grounding switches are spring-loaded, manually latched in the open position. The motor-operated disconnect switches are normally closed. Action of the substation overcurrent relays or of the sudden-pressure transformer relays trips the grounding switch. As it closes, it places a single line-to-ground fault on the 69-kv. system. Ground-fault relays at the location of the 69-kv. breakers trip them, isolating the faulted substation. The same action that trips the grounding switch also opens the motor-operated disconnect switch. The utility dispatcher then can re-energize the 69-kv. line to restore service to the other transformer.

As we mentioned, Lehigh owns substations at other plants. In these cases, the company locates the primary circuit breaker right at the substation to provide local control of the incoming high-voltage line and to permit isoluation of substation faults from the rest of the utility system. Another

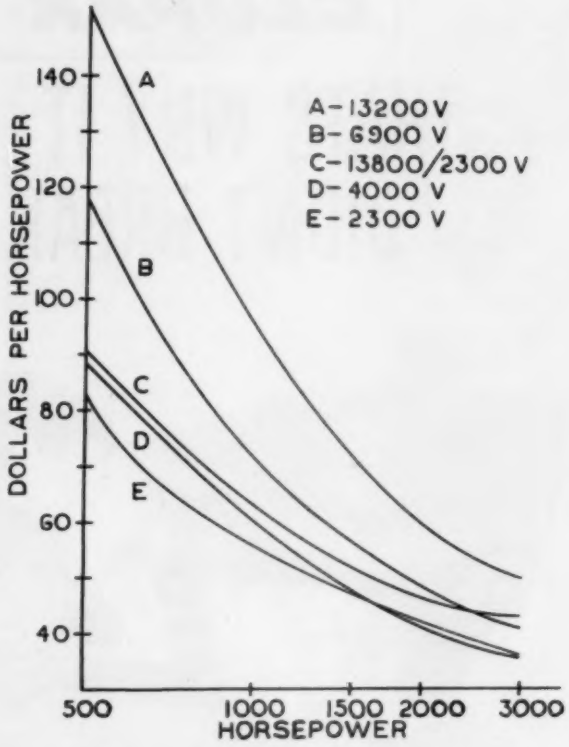
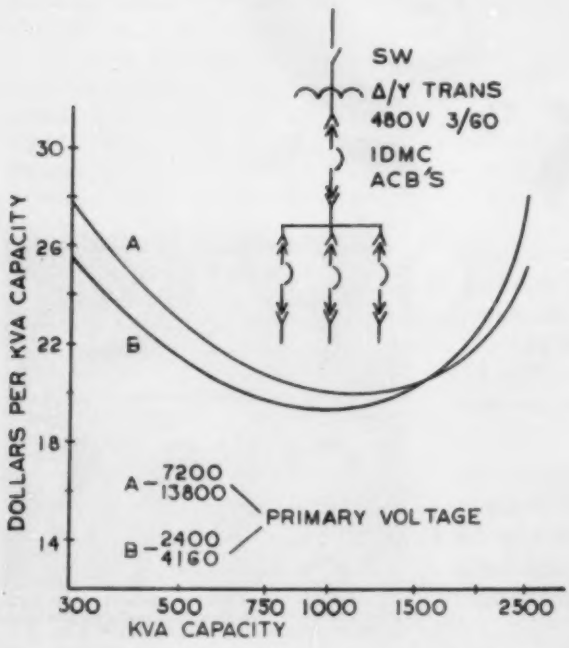



FIGURE 4—Cost comparison of ball mill drives including 200 rpm. 0.8 pf. high-torque sync motors and control. Curve "C" includes substation from 13,800 to 2,400 v.

FIGURE 3—Economic comparison of indoor power centers




Lehigh practice is to include a high-voltage breaker by-pass switch to facilitate circuit-breaker maintenance and allow for periodic cleaning of the breaker bushings without a power outage. Silicone grease is used to coat the substation porcelain so that encrusted contaminants may be removed easily. A neutral grounding resistor for each transformer also is used—this eliminates switches in the resistor circuit.

Single-shot, 30-cycle reclosing is used on the incoming 69-kv. transmission line to restore service on self-clearing faults. The second reclosure is manual. However, the momentary power outage allows the large synchronous mill motors to slow down and shift in phase position with respect to FP&L Co. Reapplication of power to these motors when out of synchronism could result in inrushes and torques well in excess of machine ratings, with damage to motor windings, gears and shafts. Lehigh avoids this by isolating the synchronous machines from the utility prior to any automatic reclosing action. It is achieved through the use of

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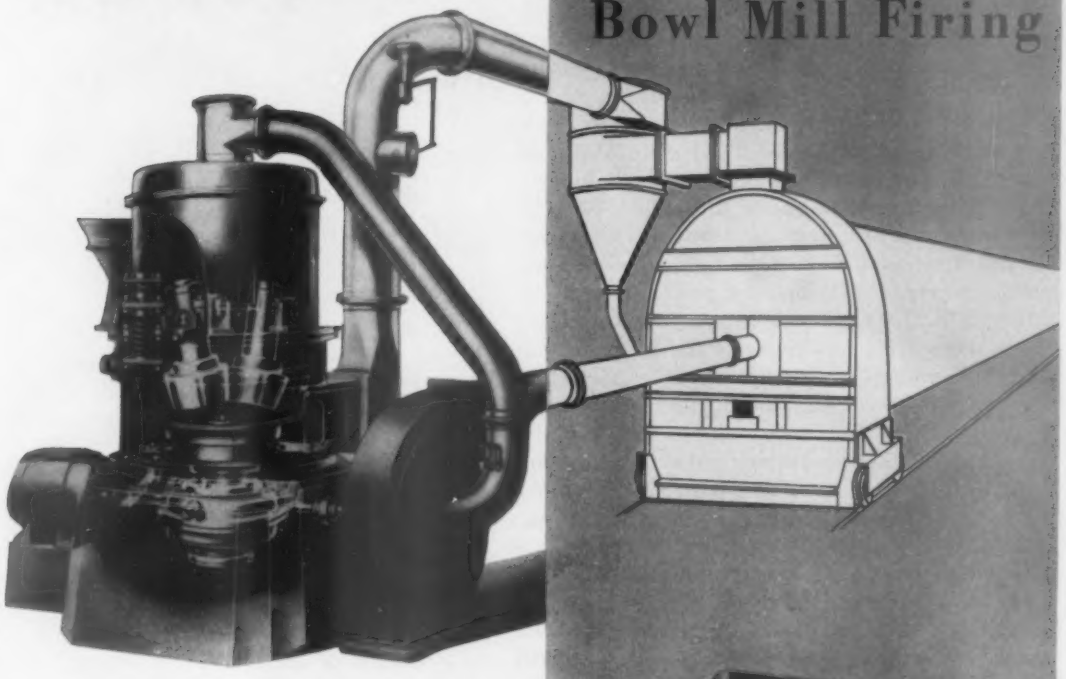

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## LEHIGH'S MIAMI PLANT HIGHLIGHTS ADVANCED THEORIES

*continued from page 172*

instantaneous underfrequency relays. Used on a synchronous motor control, an underfrequency relay immediately detects a drop in motor speed and acts to isolate the motor before a reclosing action.

**A double-ended arrangement was chosen** for the 15,000-kva. (future 18,750-kva.) substation because of the additional flexibility and reliability it offered over the single-ended substation. Some of the advantages are: periodic insulator and bushing cleaning; no-load tap changing; reduced-capacity operation, all without a power outage. Advantages of the choice of capacity are excellent voltage regulation and capacity for future expansion. The kva. requirement is about 11,000, about half the total connected plant hp. and lighting kva. Almost total plant operation can be handled by a single 7,500-kva. transformer with fans to bring the rating to 9,375 kva. The power factor is expected to be close to unity, as the reactive vars contributed by large synchronous grinding mill motors compensate for induction motor load.

The voltage drop on starting the 1,250-hp. ball mill motors, the most severe system requirement, was estimated to be 5.6 percent. This is well within the acceptable maximum of 15 percent, beyond which the danger of equipment malfunction becomes real.

The large motors operated from the plant distribution voltage total about half of the connected hp. and represent an appreciable investment. Therefore, Lehigh keeps a sharp eye on ground insulation failures, responsible for most of the electrical failures that occur on motors. The company keeps repair time and expense to a minimum by limiting ground-fault current to these machines.

**The distribution system is neutral resistance grounded** at the distribution-voltage level. This method of grounding was chosen because it will limit ground-fault current to a value well below that available from a solidly grounded system and still retain the advantages of lower over-voltages and selective tripping associated with the grounded system. A 1,500-amp. resistor limits and yet allows the flow of sufficient ground-fault current to be selectively relayed with adequate margin by the feeder breaker relays.

Because it is cheaper, the resistor is intermittently rated. It requires 10 sec. at 1,500 amp. to reach rated temperature rise. Normal relay action should clear a ground fault within 1 sec. A single resistor for the whole system is used instead of one for each transformer, as FP&L Co. is sure its

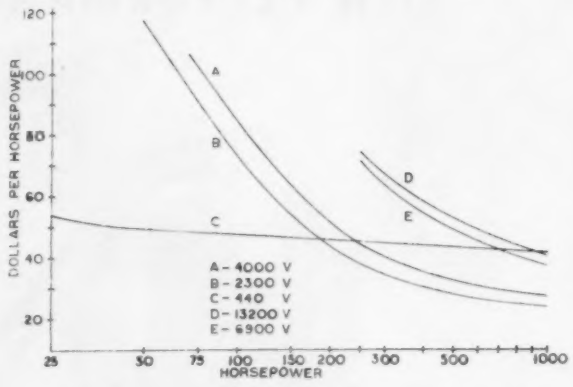


FIGURE 5—Economic comparison of motor voltages. The 440-v. curve includes motors, controls and power centers at $17 per hp. Other curves include 1,200 rpm. squirrel cage induction motors and controls

experienced personnel will take the precaution of isolating the transformer neutral when performing maintenance. Disconnect switches were provided for this purpose.

Choice of distribution voltage is an economic one, because properly installed electrical equipment and cables at any of the distribution voltages (2.4 to 13.8 kv.) are safe and reliable. Before deciding, Lehigh carefully considered costs of substations, cables, power centers, motors and control. Economic comparisons of typical equipment at different ratings appear as Figs. 2 through 5.

These facts emerge from a study of the figures: The most economical substation in sizes below 20,000 kva. is the 4,160-v.; cable costs are more favorable to the higher voltages; there is little difference in power center costs at different voltages; 2,300 and 4,000-v. motors are the most economical machines for both ball-mill and general-purpose uses over 200 hp.

On the basis of these considerations, the distribution voltage chosen for the Miami plant was 4,160 v. Power at this voltage is carried from the transformer cover bushings to an overhead 15-kv. insulated bus. Disconnect switches and a normally-open tie switch permit sectionalizing the bus, each side of which drops to cover mounted bushings included on the outdoor metalclad switchgear. The cubicles house protective relays that totalize watthours and record demand-billing metering. They also house the main 4,160-v. air circuit breakers. Multiple cables feed from the air circuit breakers via underground ducts to the switchgear room in the plant, 300 ft. away. END

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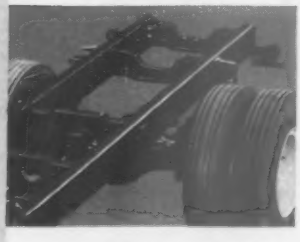
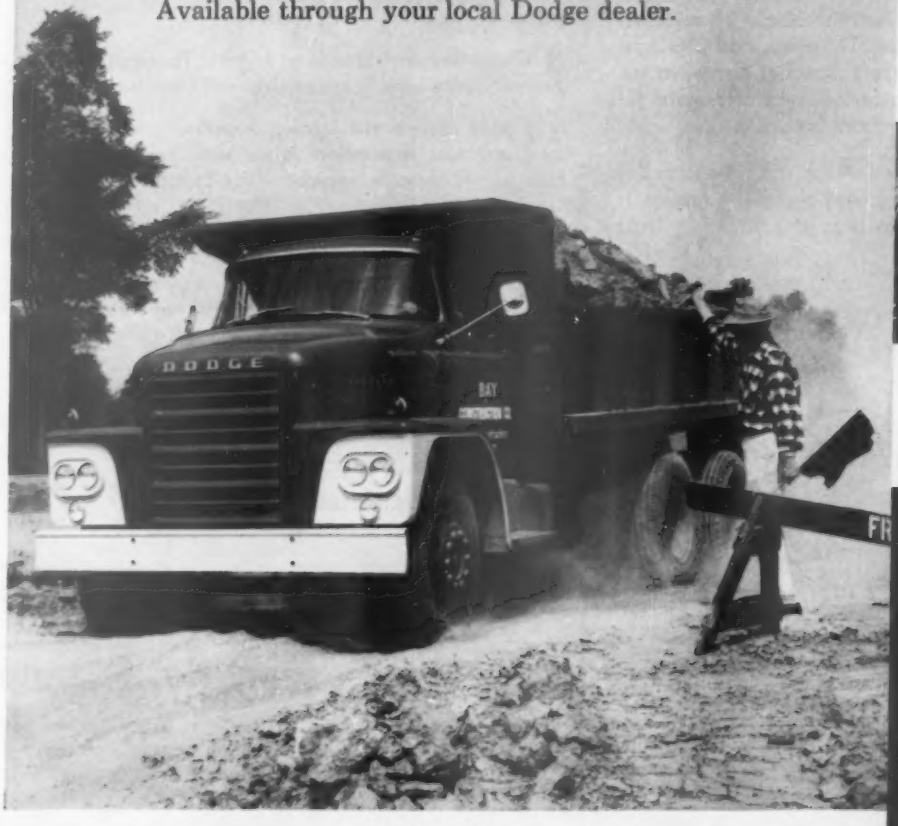
**SERVI-SWING FENDERS** open out at the pull of a latch to let a man walk right up to the engine for unrestricted servicing. This exclusive Dodge feature spares you the extra cost and bother of a tilt-cab model.

**NEW GAS AND DIESEL ENGINES** let you pick the kind of power best suited to your requirements. Gas V-8's from 178 to 228 hp.; economical Cummins diesels from 175 to 220 hp., up to 743-cu.-in. displacement.



**TOUGH DODGE FRAMES** of heat-treated, chrome-manganese steel provide exceptional load support while reducing excess chassis weight for C800 models and up.




DEPEND ON DODGE TO SAVE YOU MONEY IN TRUCKS

A PRODUCT OF CHRYSLER CORPORATION

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# LUBE LOGIC Tips for more

## How to put engines in mothballs

As hard as you try to keep all your equipment at work all the time, invariably there'll be times when you just have to prepare a piece of motorized equipment for an idle stretch. Long idle periods can take a heavy toll on an unprotected engine. These eleven steps assure you that the engine will be in as good condition when you start it up again as it was when you put it away.

**1** Run the engine for a while and drain the oil while it's hot. Install new filter element.

**2** In mild climate, drain and flush cooling system and refill with rust-inhibited water solution. In subfreezing climate, drain, flush and refill with rust- and corrosion-inhibited anti-freeze.

**3** Refill crankcase with Texaco Ursa Oil Heavy Duty, idle the engine fast for about 20 minutes, and shut it down. For diesel engines, add 3% Ursa Oil Heavy Duty (of correct seasonal grade) to the fuel before this idling period, and afterward fill the tank with a good diesel fuel.

**4** Remove spark plugs and squirt a little Ursa Oil Heavy Duty into spark-plug holes while engine is being turned over. Dip plug electrodes in Ursa and replace.

**5** Coat each lobe of distributor breaker cam with Texaco Rustproof Compound L. Replace distributor cap and seal breather hole in cap with waterproof tape.

**6** On ohv engines, remove valve cover and squirt Ursa Oil Heavy Duty on rocker mechanism, interior of valve cover, and between cylinder block and side plate cover.

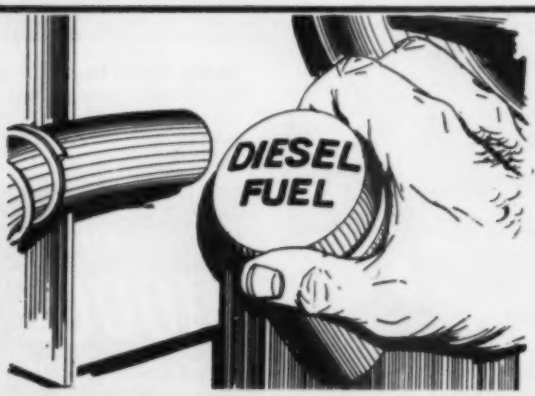
**7** On gasoline engines, drain fuel tank, lines, pump, strainer and carburetor. Afterward, close all openings and reconnect all fittings.

**8** Remove battery, store it in cool dry place, keep water level up. Recharge periodically. Apply Texaco Rustproof Compound L to battery terminals, leads and container. Loosen fan belt; insert paper between belt and sheaves.

**9** Clean and dry outside of engine. Touch up unpainted spots with Texaco Rustproof Compound L.

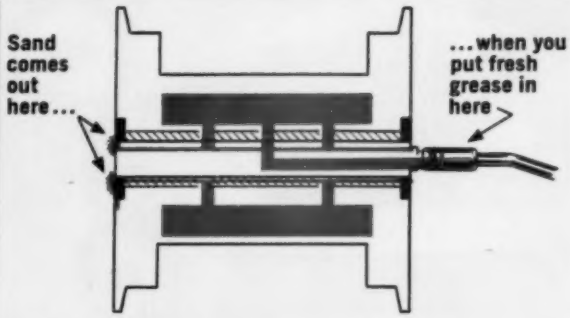
**10** Seal engine air intake, breathers, exhaust and exhaust expansion joints with waterproof tape or heavy paper secured with waterproof tape.

**11** Tag engine and engine parts with detailed information on rustproof measures taken.




## Identify the fuel you want

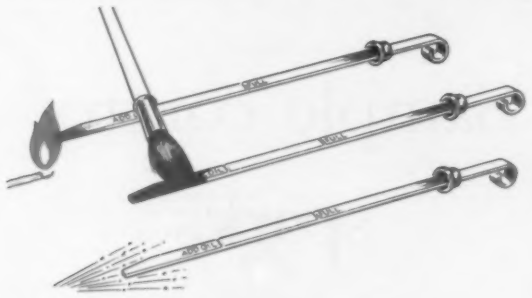
Let one absent-minded maintenance man put gasoline in your diesel tank and as the fliers say you'll be "bailing out over Denver." It's happened. Best way to avoid its happening to *you* is to mark your fill cap; "Diesel Fuel" or "Gasoline." Then nobody should make any mistakes.




## Track-roll enemy No. 1: sand

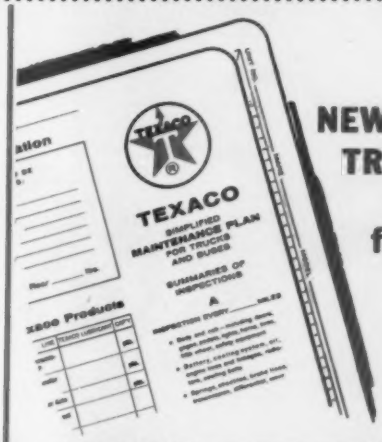
If you're operating a crawler-tractor in sandy soil, the best way to keep sand from getting into the track-roll bearings is to keep purging the bearings with fresh grease. Most track-roll bearing seals are especially designed for this type of purge-lubrication, and the grease that comes out around the edges of the seal during lubrication carries the sand out with it.

# efficient maintenance



## How to read dipsticks without squinting

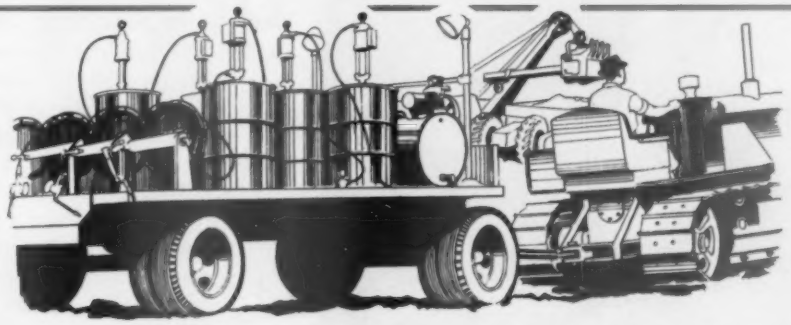
The modern inhibited motor oil that keeps the inside of your engine clean also keeps the oil dipstick clean—and often too shiny to read. Here are three solutions for this problem—take your choice. 1. Heat the end of the dipstick so that the metal darkens slightly. 2. Paint the end of the stick with a dull-finish cellulose lacquer. 3. Run the stick across the spark-plug cleaner to take off some of the shine. (If you use the spark plug cleaner, use the smallest rubber plug bushing and hold the dipstick over the hole with a wad of cloth to keep sand from scattering around the lube box.)




## NEW TRUCK RECORD FOLDER fits itself into your schedule

Texaco's flexible new truck record folder lets you stick to the lube schedule that works best for you without running into bookkeeping problems. Lubrication and oil schedules are completely separate from mechanical maintenance and replacement parts schedule—you don't have to follow any pre-established routine to use the folder profitably. And this new folder accounts for every single dollar you spend on truck maintenance for a whole year. Get yours now.

## Do-it-yourself lube rig trailer



Maybe you're aware of all the advantages of a mobile lube rig, but just don't want to tie up a truck for this purpose. Or, perhaps you'd like a supplementary rig. You can solve either problem neatly by mounting your field lubricating equipment on a standard 5-ton farm trailer. That way, you can take your whole Simplified Lube Plan out into the field where it's needed, without costly deadheading back to a fixed service point—and you can move the lube rig just by hitching it to any truck, so it's just as mobile as a truck-mounted rig at much less cost. And here's a bonus: by hitching your lube rig trailer to a bulldozer, you can take field service to spots that wouldn't be accessible to a regular truck.

Trailers for this purpose, as well as tanks and pumps, are all standard items you assemble yourself to meet your own requirements.

## TEXACO LUBRICATION ENGINEERS

Every month or so we'll bring you a batch of "sleepers", little angles, so easy to overlook, where big savings in money and time can be made. But month in, month out, your local TLE is the best source of money-saving lubrication ideas. Don't forget that "Lubrication is a major factor in cost control."

Texaco Inc., 135 East 42nd Street, New York 17, N. Y.

**TEXACO**

*Throughout the United States*

*Canada • Latin America • West Africa*

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*For Huron Portland Cement:*

# Sample control sparks fuel economy

by D. G. Smellie*

WHEN SPENDING ABOUT $5 MILLION A YEAR for coal, as we do at Huron Portland Cement Co., we naturally look for ways to get the most for our fuel dollars. Our large kilns at Alpena, Mich., require somewhere between 500,000 and 600,000 tons of bituminous coal annually, depending on production schedules. That is a hefty sum in any accountant's ledger. So we have developed a coal purchasing program that is enabling us to broaden our supply base, keep costs down and reduce the effect of variations in coal quality upon the production department.

The cornerstone of the whole purchasing program is our completely revised coal sampling and sample preparation technique. Developed with the assistance of a New York engineering company which specializes in fuel selection, procurement and utilization programs, the sampling system tells us whether or not the coal actually delivered is as represented.

The 1¼-in. x 0 bituminous coal that fires our kilns and becomes an integral part of our cement also powers our plant. Heat from exhaust gas is used in waste heat boilers that generate steam for our electric power plant. Coal is delivered to our dock in Great Lakes self-unloading vessels, then moved by a twin-engine scraper to the coal

*Please turn to page 180*

COAL IS SAMPLED during boat unloading operations

*Director of Purchases, Huron Portland Cement Co.

Enter 1145 on Reader Card

# Fairbanks Nº 1

*a scale, our first one.*
*an imagination of iron, brass, copper and lead,*
*fashioned in a New England workshop.*
*inanimate.*

*but it spoke—*
*a different kind of language,*
*of pounds and ounces and fractions thereof*
*and it spoke only the truth.*

*it felt—*
*the roundness of grain, the smoothness of marble,*
*the sweetness of candy and the authority of gold.*

*it heard—*
*the sound of life, babies newborn*
*it cradled them and recorded their growth*
*until pounds and ounces were replaced*
*by years and months.*

*it traveled—*
*by packet boat down the Mississippi,*
*by clipper ship to England,*
*The Sandwich Isles, the Indies,*
*South America and China.*
*better known throughout the world*
*than anything else made in America.*

*it was relied on*
*by farmers, merchants,*
*scientists and doctors.*
*it witnessed history;*
*influenced it and was part of it.*

*its descendants have new names.*
*floaxial dial, mercoid switch,*
*reed switch and cotton lap;*
*remote control,*
*printomatic,*
*electronic and levetronic.*
*all serve to evaluate and control*
*the substances that make up*
*the universe.*

*raw materials*
*or manufactured articles;*
*things unseen or man himself;*
*all have weight and must be measured . . .*
*our scales do the job.*

*and the new challenge—*
*weight in motion . . .*
*freight trains in transit,*
*trucks too busy to stop,*
*liquids coursing through miles of pipe . . .*
*our scales will do the job.*

*but this was our first—*
*Fairbanks No. 1*
*and we hold it in special reverence*
*for it weighed the most precious thing of all.*
*it weighed an idea.*

# Fairbanks, Morse

A MAJOR INDUSTRIAL COMPONENT OF FAIRBANKS WHITNEY CORPORATION, NEW YORK

Scales for heavy industry and for business; scales for science and for the home. Scales that weigh milligrams or millions of pounds. Scales that weigh missile fuel loads at Cape Canaveral; trucks on the Golden Gate Bridge; onions at your neighborhood grocer's . . . we make every kind of scale for every kind of purpose, including electronic scales. We are the Number 1 manufacturer of scales and automated weighing systems in the world.

If you have a problem where the careful calculation of weight is of vital importance, please write to Mr. Robert W. Kerr, President, Fairbanks, Morse & Co., 600 So. Michigan Ave., Chicago 5, Illinois.

## SAMPLE CONTROL SPARKS FUEL ECONOMY

*continued from page 178*

MOISTURE CONTENT OF COAL is determined in air-drying oven cabinet in sampling preparation house

storage pile. There, it is compacted by the scraper to a density of close to 70 lb. per cu. ft., thus preventing spontaneous combustion and excessive moisture accumulation.

The quantity of coal in the storage pile varies continually throughout the year, but one thing is certain: On Dec. 1, when the lake shipping season comes to a close, it must contain about 200,000 tons. This tides us over the four-month period until shipments by lake freighters can begin again, usually around mid-April. Coal brought to Alpena is dumped into the lake freighters at a Lake Erie port to which it is delivered by rail.

Reclaimed by a scraper from the storage pile, coal is fed into the handling system which conveys it to the mills for drying and pulverizing. The coal is then fired into the kiln either through direct-fired or bin-fired systems.

Before our present purchase program started, our methods followed a rather conventional pattern. As loaded cars arrived at lake ports from the suppliers, the coal was sampled by the car-top sampling method. While this is an accepted method, it will not always produce a thoroughly representative sample of the contents of a fully loaded railroad car. The chances for error are great and allow for too much variation in the matter of coal size. For example, in nut and slack sizes a car-top sample might well show up much coarser than the average of the car, depending on how the car was loaded.

The car-top sampling method gave us a partial check against the analyses submitted by vendors in advance of purchase. However, we found some samples at wide variance with vendor representation, and efforts to resolve such differences all too often tended to confuse rather than clarify matters. Occasionally price adjustments had to be worked out.

At this point it was realized that we were operating under an only partially satisfactory system and that there was considerable room for improvement. The shortcomings of existing methods were imposing inequities on both our suppliers and ourselves, and improvements were needed that would treat both of us fairly. Then too, coal obtained by these methods caused difficulties in operations and unsatisfactory relations with suppliers. Prospective economic opportunities in the coal market continued to elude us in spite of our best efforts.

Huron management became convinced that the assistance of experienced fuel technologists was desirable and the consulting firm was called in. Their engineers made a detailed survey of the entire plant and facilities. Kiln capacities and operating peculiarities were investigated.

A considerable amount of time was spent with operating personnel learning about their problems from their point of view, and in observing ring formations, load positions and flame characteristics. Sizes and capacities of coal-handling and pulverizing equipment were analyzed. Then detailed requirements of the mill in terms of coal characteristics were worked out with the full collaboration of management, purchasing, production and operating personnel.

Limits were established which reflected recognition of (1) firing floor operating problems, (2) known effects of coal characteristics on clinker quality, (3) coal handling, (4) equipment limitations, (5) production capacity requirements, (6) energy costs of coal delivered at Alpena, (7) non-

*Please turn to page 182*

# WIDE RANGE OF SIZES THROUGH 10"!

## ALLOY OR RUBBER COVERED PARTS!

## HIGH HEAD APPLICATIONS!

**WILFLEY**
**SAND PUMPS**

Wilfley Sand Pumps
"Companions in Economical Operation"
Wilfley Acid Pumps

There is a Wilfley Sand Pump to meet your specific requirements in the transfer of solids. Wilfley's wide range of sizes, capacities, and interchangeable parts give you versatility in the handling of sands, slimes, sludges, slurries – abrasives of all types.

Whether you need belt driven, overhead V-belt driven, or direct driven sand pumps, Wilfley has them. Wilfley Sand Pumps guarantee lower pumping costs, higher output and maintenance-free service. Write, wire or phone for complete details.

*Every installation is job engineered for maximum pumping economy.*

A. R. WILFLEY and SONS, INC.

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## SAMPLE CONTROL SPARKS FUEL ECONOMY

*continued from page 180*

thermal coal characteristics which influence energy values in coal and (8) the availability of coals of given characteristics.

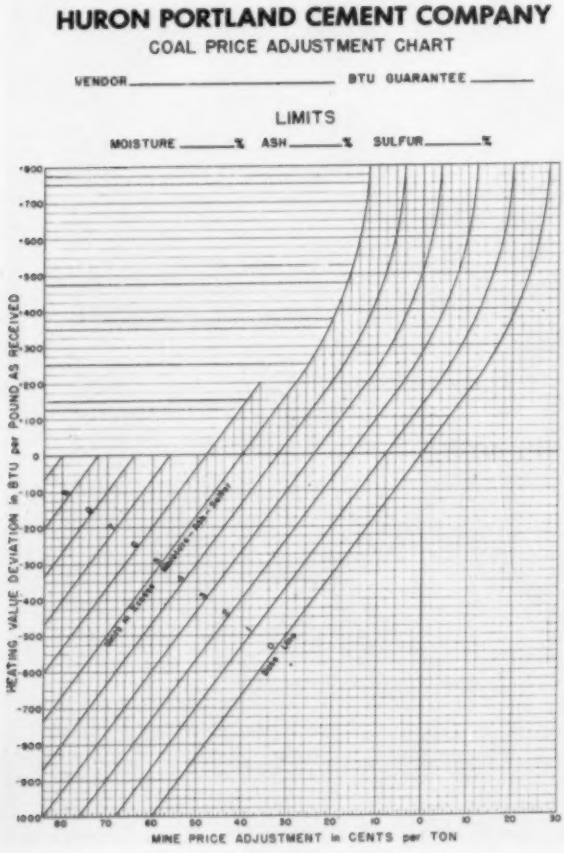
Car-top sampling was discontinued. A completely new coal-sampling and sample preparation program was set up at Alpena to obtain as accurate and as representative samples of the coal as modern development of the art would permit.

**This is how our current program operates:** Coal vendors are supplied with our quality requirements and submit a statement of the quality of their coal. The vendors' statements of quality are evaluated with the general quality of the seam and the area provided by our own past experience and the records of the consulting engineers. The reliability of the shipper is checked. The cost in cents per million Btu. is calculated.

If, at this stage, the offer by the vendor falls within our requirements and the cost per million Btu. is currently competitive, we may order a trial shipment. We are then prepared to set into motion the checking system to assure that the coal received is as represented. It starts with accumulation of gross samples from the boats as coal is being transferred to the dock at Alpena.

Proper sampling and sample preparation are often considered to be rather simple operations. Because of the natural variability of coal characteristics, including sizes of the coal particles, very carefully conceived methods, uniformly applied with meticulous attention to details, are necessary if truly representative samples are to be obtained consistently. It is important, therefore, to have qualified personnel to perform these tasks.

PRICE ADJUSTMENT CHART is used to determine billing price of shipments


HURON PORTLAND CEMENT COMPANY
COAL PRICE ADJUSTMENT CHART
VENDOR
BTU GUARANTEE
LIMITS
MOISTURE % ASH % SULFUR %
HEATING VALUE DEVIATION in BTU per POUND AS RECEIVED
MINE PRICE ADJUSTMENT in CENTS per TON

**Our employes are trained in the use of ASTM methods** for securing representative samples and are under the direct supervision of our assistant chief chemist. Each year an instruction class is held which serves as a review for the experienced samplers as well as indoctrination for new employes. Special wall-chart flow diagrams provided by the consultant showing the methods to be used are hung in the sample-preparation house on the dock.

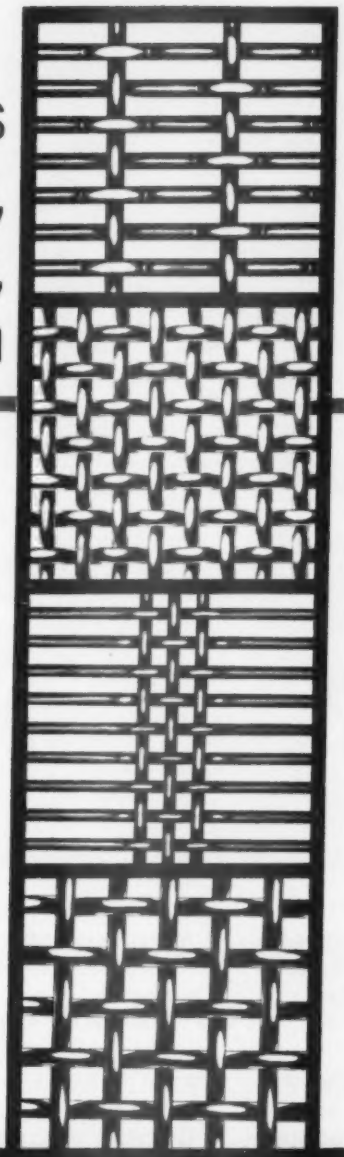
In addition, their specialists have prepared an illustrated manual describing in detail each step of the procedure. Copies of this manual are kept available for ready reference at all times. Sampling instructions explain how gross samples are to be accumulated from each hold as the ships are unloaded. Proper use of all sampling paraphernalia is explained down to the smallest detail. Special instructions cover prevention of pick up or loss of moisture.

Samplers are directed to look for and report to the laboratory any unusually wet conditions of the boat or the coal. Instructions include carefully worked-out methods for maintaining the identity of the samples at all times. Much of the credit for the success of our new sampling procedures is also due to the cooperation and helpfulness of vessel operators.

**Sample preparation equipment is carefully checked** by our consultant several times each season. Adjustment of crushing, grinding and riffling equipment is checked by special screen tests and ash determinations. Special techniques are used to test the entire procedure for bias and precision so that we may be sure our work is held

*Please turn to page 184*

# Fights abrasion, fatigue, distortion



The hardest, toughest wire metallurgical science can produce—woven to exceed the industry's top standards for precision and rigidity—levelled and sheared on special machines to absolute flatness and accuracy—then finished with hook strips or edge hooks as straight as a die.

Small wonder that L-S Screens can be installed under greater tension, will stand up far longer against wear and breakage. Result: Fewer screen replacements, higher output, more uniform product quality.

Bonus! L-S Screens cost no more than ordinary screens. Insist on L-S Screens when you order. *Write for Condensed Screen Reference Catalog.*

Ludlow-Saylor Screens and Wire Cloth can be furnished in any steel including SUPERLOY high carbon, LUDLOY oil-tempered, stainless or other alloys; Monel, bronze, copper, brass or any metal that can be drawn into wire.

**IMMEDIATE SHIPMENT**
most weaves and sizes

# LUDLOW-SAYLOR
## WOVEN WIRE SCREENS

*FOUNDED 1856*

**LUDLOW-SAYLOR WIRE CLOTH COMPANY • 602 SOUTH NEWSTEAD AVENUE • SAINT LOUIS 10, MISSOURI**

**LOS ANGELES** Star Wire Screen & Iron Works, Inc. (L-S Subsidiary), 2515 San Fernando Rd.

**BIRMINGHAM** 512 N. 18th St. **CHICAGO** 6261 West Grand Ave. **DENVER** 1530 Carr St. **HOUSTON** 5638 Harvey Wilson Dr. **PITTSBURGH** Union Trust Bldg.

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## SAMPLE CONTROL SPARKS FUEL ECONOMY

*continued from page 182*

HURON STAFF receives instructions in sampling and sampling-reduction procedures

within ASTM limits. Our laboratory is continuously monitored by the consultant's laboratory as a double precaution against errors, and paired comparison statistical methods are used to detect any bias at 95-percent levels of significance.

Not all gross samples can be reduced by repetition of identical steps because high moisture can cause crushing, grinding and riffling problems that can harm the integrity of the sample. We use two-stage reduction with alternative procedures, depending on the moisture content of the coal. Our wall-chart flow diagram shows the alternative steps to be employed.

When the gross sample has been properly reduced, it is divided into four parts by cross-riffling procedures. One part goes to our laboratory for analysis, and on every tenth sample another part goes to the consultant's laboratory for monitoring analysis. Two portions are held in reserve for special analyses and for referee analysis in case a vendor elects to challenge results. Our sampling and sample preparation are open to inspection by vendors at any time.

**We maintain close liaison with coal producers.** While virtually all our coal is purchased through brokers because of the valuable services which they can and do render, close liaison with mine operators contributes to maintenance of low fuel costs and sound, stable sources of supply. We make periodic trips into the coal fields to renew and strengthen previously established relationship. At the same time we examine new sources of supply, observe new developments in the field and get market and price information.

We make coal field visits accompanied by a member of our consultant's staff an integral part of our current program. On these visits we discuss past performance with operators and learn at first hand about their problems. We exchange with them details of our own operations which we believe will help them to better understand our needs. It is surprising how often we find that producers are thinking in terms of coal being burned under boilers to raise steam, completely overlooking the fact that part of their coal actually becomes a physical part of our product and directly affects cement quality.

We have found that producers almost unanimously welcome the opportunity for this personal exchange of ideas and information. Almost without exception they are eager to show us every detail of their operations despite the inconveniences involved. From this close liaison springs a spirit of mutual confidence which is most effective in helping us to work in closer harmony with our suppliers.

The vendor guarantees both the price and the quality of his coal with the understanding that the price will be adjusted according to variations in heating value and other nonthermal characteristics. He is given a special price adjustment chart on which specific limits in moisture, ash and sulfur are shown, together with his guaranteed heating value. This chart is a graphical representation of the effect that variations in quality of the coal have on its value for our use.

After each delivery he is sent a copy of the coal anaylsis on that lot and the corresponding adjustment (if any) to be made in his billing price. The vendor is then in a position to check the adjustment on his own chart and he may, at his discretion, elect to challenge the analysis. In that case the procedures described earlier go into motion. If a vendor's coal continually falls short of his guarantee, we reduce our previously committed tonnage, and may even stop buying from that source altogether.

Consulting engineers for this project are Fuel Engineering Co. of New York, 215 Fourth Ave., New York, N.Y. END

One of the ten electric-control C Tournapull Rear-Dumps working at the Lallingerberg pit, Esch-Sur-Alzette, Luxemburg, is loaded with 22 tons of iron ore. The LW Tournapull fleet, owned by the Luxemberg firm, ARBED, moves more than 12,500 tons of ore 1¼ mi to the crusher per 24-hour day.

# • Works more productive hours

# • Moves more tonnage

# • Lowers costs

Rugged, simplified construction is one big reason why LeTourneau-Westinghouse Tournapull® Rear-Dumps keep working efficiently day after day, year after year, to help pit owners cut costs. Check these important LW Rear-Dump features:

• **Heavy-duty bowl** — has triple-layered steel floor to resist heaviest loading jolts. Sloping sides deflect load shock, quickly cushion floor area with layer of material.

• **Front-wheel drive and electric kingpin steer** — eliminate a great number of trouble-causing parts. No longer must power be carried back to the rear through a long drive-shaft, with its bearing, universal joint, and lubricating problems. And no longer is steering handled by small front wheels subject to misalignment as they try to get out of ruts.

• **Big, low-pressure tires** — absorb the shocks of off-road travel and shovel loading, eliminate the need for springs.

• **Electric-control system** — is never affected by excessive heat, cold, moisture, or dust. Point-of-action electric motors keep cable requirements low.

• **Exclusive power-transfer differential** — reduces costly wear on tires, clutch, and transmission caused by spinning wheels in slippery or loose footing — lets you work in difficult conditions where other competitive units bog down.

Advantages like these — plus short radius turns, fast, clean dump, giant air brakes, excellent visibility — add up to high production and low costs.

LeTourneau-Westinghouse Rear-Dumps are available in 3 sizes: 11, 22, and 35 tons. LW scraper, bottom-dump, and crane trailing-units are interchangeable behind the same Tournapull prime-mover. Ask for complete details.

CR-2076-MJ-1

LW

**LeTOURNEAU-WESTINGHOUSE COMPANY,** PEORIA, ILLINOIS

*A Subsidiary of Westinghouse Air Brake Company*

**Where quality is a habit**

Part 3*

# How fuel economy keys lime kiln automation

by Victor J. Azbe†

AS LONG AS NATURAL GAS IS AVAILABLE, it will continue to be used to make lime. But any shortage of this resource will call for the use of gasified coal, fuel oil or wood—anything of which some part is combustible, oil shale for example. The kiln must have high enough capacity to justify its own producer like the unitized system of Figure 15.

Recirculation in lime kilns must be hot recirculation, taken from low in the kiln. It must be isocaloric (recirculated without loss of heat) even though it passes through various temperature levels. This is a concept not yet widely understood.

A kiln is a complex of features, each of which has a definite purpose. There are many reasons for the arrangement of the exhaust system. This provides minimum external gas friction with maximum kiln flow. Other systems of stone charging have also been developed, including the pressurized double-seal system. This effectively prevents all tramp air entrance and maintains the highest $CO_2$ concentration. It is then possible to obtain the true exhaust gas analysis and temperature which may be used for automatic control of the kiln.

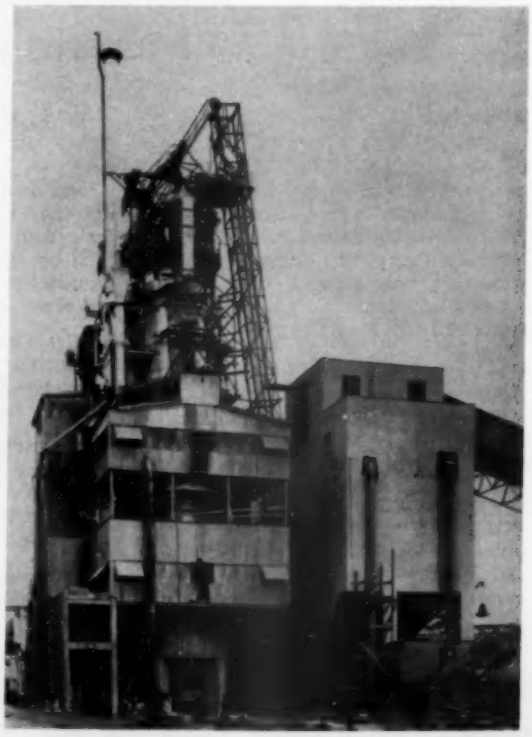
The nearest approach to this ideal kiln was that of M. J. Grove Lime Co. at Stephens City, Va. Although it was not arranged exactly the same and operating conditions by no means ideal, record-breaking results were obtained.

Actually, the stone was too large, requiring excessive time for its calcination. It was a hang operation, entailing infrequent drawing of lime, rather than slip operation which tends to loosen up the kiln for a much higher gas flow rate. Furthermore, fan connections were not direct, causing pipeline friction which reduced the gas flow rate. When gas flow rate is reduced, kiln production is reduced; and when production is reduced, thermal efficiency of the system is reduced.

Still, after the operators became acquainted with the kiln, phenomenal results were obtained. Records unequalled by any coal-fired kilns were established, with a monthly average of 90 tons of lime per day. Fuel ratio was 6.56 tons of lime per ton of coal for a consecutive period of four days. Heat requirements per ton of lime were 4.23 million Btu. high heat value or 4.1 million low heat value

*Please turn to page 188*

THESE OIL-FIRED NORWEGIAN KILNS are probably the most efficient kilns in the world



*See also Part 1, *From primitive to modern in fifty years*, and Part 2, *Vertical lime kilns leap into maturity*, March and April, 1960, ROCK PRODUCTS, pp. 122 and 110 respectively.

†President, Azbe Corp., Clayton 5, Mo.



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1 Mobile Tournatractor cleans-up around 7 widely-separated shovels . . .

2 Cleans-up pit-floor after blasting . . .

3 Levels and compacts stockpiles . . .

# How heavy rubber-tired tractor cuts pit clean-up costs

4 Handles clean-up at waste dumps . . .

At Texas, Maryland, the Harry T. Campbell Sons' Corporation operates one of the largest limestone quarries in the eastern states. With a half-dozen shovels, and numerous stockpiles over a considerable area, the firm once kept 2 crawler tractors busy on maintenance and clean-up work. But like all track-type tractors, the rigs spent about as much time just going from job-to-job as they did working.

"We bought Tournatractor to do the work of a crawler tractor whose main job was to clean-up the quarry floors," says Superintendent Eddie Reichert. "It really moves around our pit and does a grand job."

Owners of the Harry T. Campbell Corp. agree. "It's Tournatractor's speed that does the trick," says Mr. Campbell . . . "Tournatractor completes the clean-up job so fast, that it is available to do many other jobs throughout the quarry operation. In addition this rubber-tired tractor requires less maintenance than any track-type tractor."

Illustrated and described here are some of the jobs handled by this "go-anywhere", rubber-tired LW tractor during a single work shift.

5 Cleans-up around crusher-grizzly as well as polices entire plant area . . .

6 Maintains haul roads as it "runs" from one job to the next . . .

**See it in action**

Let us show you how 17.2-mph, 218-hp Tournatractor can save you money on widely-separated dozing, towing and pushing jobs. Ask for complete facts and demonstration.

CT-2025-MQJ-1

LW

**LeTOURNEAU-WESTINGHOUSE COMPANY,** PEORIA, ILLINOIS

*A Subsidiary of Westinghouse Air Brake Company*

**Where quality is a habit**

## HOW FUEL ECONOMY KEYS LIME KILN AUTOMATION

*continued from page 186*

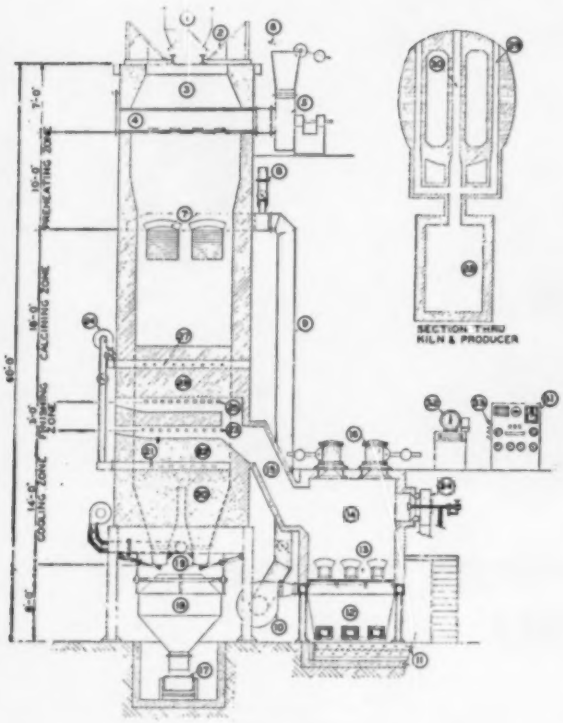



FIG. 15—A typical kiln of unitized design with recirculation of hot exhaust gas to the undergrate of the gas producer

(metric equivalent would be 1.13 x $10^6$ kg. cal. per tonne).

A careful study revealed that if stone were sized by passing it through a screen, the kiln could be drawn automatically and frequently by the slip method. If the exhaust line friction losses could be eliminated, a production of 125 tons would be attained with a fuel ratio of better than 7:1. This is at least 3.96 million Btu. high heat value or 3.82 million Btu. low heat value per ton of lime (metric, 1.05 x $10^6$ kg. cal. per tonne).

Results like this are completely unimaginable in a series of kilns supplied with unequally distributed gas through long gas flues from a distantly located gas producer of indefinite performance. These results are possible only with close integration of the kiln and gas producer system.

The bed of a mechanical gas producer usually has several feet of ashes, but at Stephens City they carried only 3 in. While the fuel bed of a mechanical producer may be an uneven 18 in., that of the Azbe-type at Grove's had a reducing zone of 40 in. and a volatizing zone of 13 in. for a total of 53 in. The usual blast pressure in the high ash producer is up to 10 in.; at Grove only 2 in., even though the fuel bed was very thick. The Grove producer blast was very hot and very high in $CO_2$.

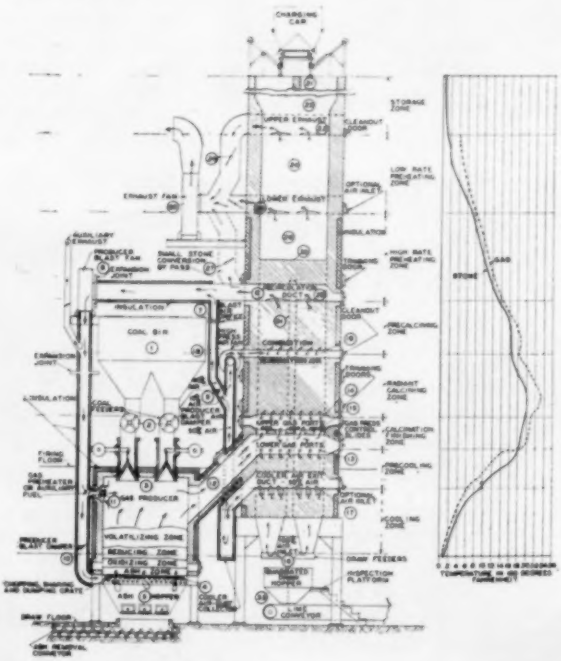
The lime weighing system in Fig. 15 was first used at the M. J. Grove plant in Virginia. It was positive, automatic and quite simple. Volumetric discharge feeders have also been developed for the same application.

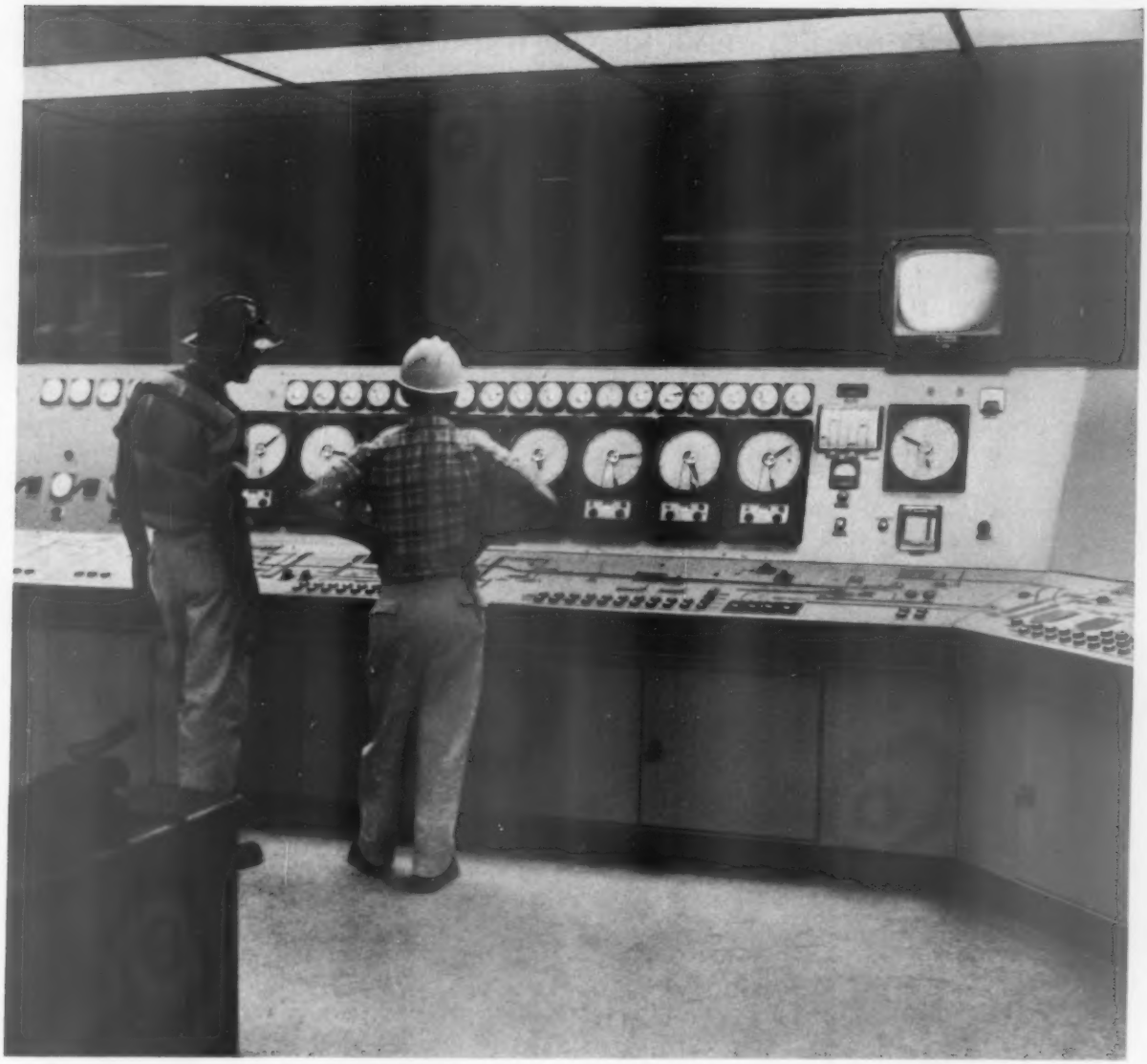
Fig. 16 is a composite of a kiln with features which would possibly never be used all at one time. It is a copy of patent drawing, and patents for it have been granted in United States and several foreign countries. The system was described completely in ROCK PRODUCTS, January and May, 1957. Note the ash bed of 3 in. which can be even thinner. All of the blast pressure is applied to the very thick fuel bed and, therefore, a very high gasification rate is possible. This is all quite different from that of a high-ash gas producer, Fig. 17, in which the blast pressure is expended mostly in the inactive ash bed. Soot deposited in the gas leads is pushed back into the producer to be gasified or blown into the kiln to be burned. The kiln has a series of firing levels and exhaust levels.

There are many other possible types of installa-

*Please turn to page 190*

FIG. 16—The "ideal" lime kiln combines practically all of the desirable features developed for maximum fuel economy and product quality





# Is this a cement plant?

Yes . . . and as you step into the quiet cleanliness of this air-conditioned room, you take a step into the "future" . . . a future that today, for you, can become a reality.

In the quiet of the control room, an operator monitors every step in the cement-making process at Ideal Cement Company's new Tijeras, New Mexico plant.

One man operates the latest electronic instruments, directs, records and controls the flow of material into the entire production process . . . from the crusher to the final cement storage silos.

At modern plants like Tijeras you find L&N's Speedomax H up front, measuring, recording . . . keeping a watchful, dependable eye on the process.

If you're thinking of the future, or thinking of today, a call to your nearby L&N office can be the first step to more profitable operations with Speedomax H . . . the ideal instrument for rotary kiln control.

*At your service is the most experienced supplier of rotary kiln instrumentation and controls: Leeds and Northrup Company, 4975 Stenton Ave., Phila. 44, Pa.*

**LEEDS** Instruments **NORTHRUP** Automatic Controls • Furnaces

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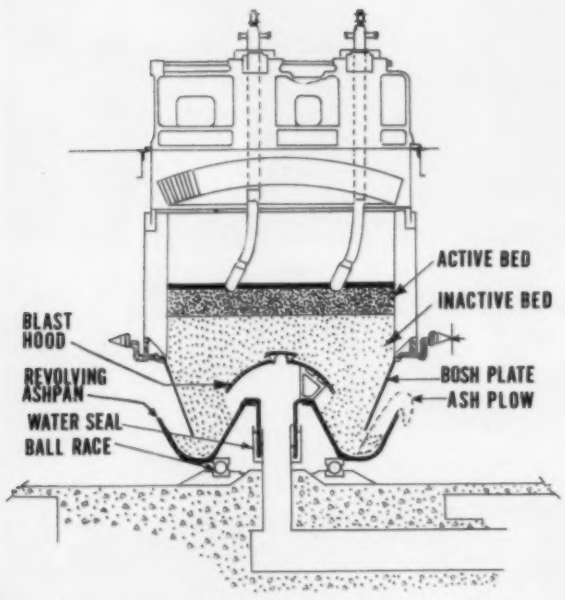


FIG. 17—Typical high-ash gas producer with undergrate blast

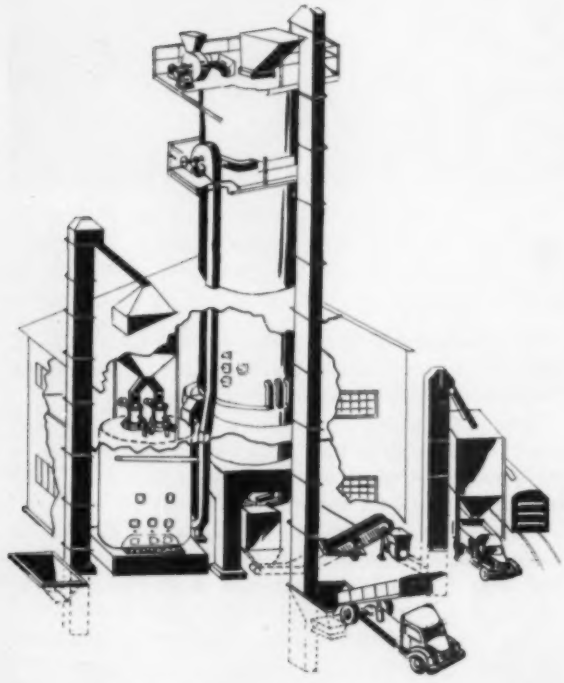

FIG. 18—A single lime kiln arranged to burn coal and to process medium-size limestone

tion, like the single-kiln lime plant of Fig. 18 which is arranged for coal and medium-sized limestone, or the Magnesita-Brazil arrangement, Fig. 19. Here charcoal was used and magnesite dead-burned at 3,250 deg. F. to nearly complete crystalline consolidation. There may be a single kiln, or groups of kilns, but each would have its own producer and operate independently like the wood gasifying plant of Fig. 20.

**Most of us remember wood-fired kilns** for their low, 12-ton daily production. But two wood-burning kilns are producing in excess of 130 tons of lime a day each—the highest production of any wood-fired kilns in the world! They operate at a rate of two tons of lime per sq. ft. of kiln hot zone area at one of the lime plants of I.R.F. Matarazzo.

Count Francisco Matarazzo is a South American industrialist for whom we have been consulting engineers for the past 10 years, and is the possessor of one of the largest Latin American industrial empires. Only his progressiveness could bring a wood-fired kiln to nearly 150 tons production, just as only Union Carbide could coax a natural gas kiln to 450 tons production.

The kilns are very efficient, but immense quantities of wood are required for such high production. The wood is grown systematically on immense tracts of land and harvested periodically. It is gasified, as all wood or wood waste that is to be burned should be. Each kiln has its own gas producer, with the gas given no chance to cool before entering the kiln. Wood is clumsy to handle but it is a very good fuel for making lime when pregasified; otherwise it is the worst.

**Fuel oil as a lime kiln fuel** is rapidly increasing. Its application to rotary kiln use presents no problems as it does for vertical kilns. It cannot be introduced into the kiln as a liquid; it must be pregasified and introduced as a vapor or gas. To do this in a thermally efficient way presented many thorny and messy difficulties. Eventually these were satisfactorily eliminated.

A photo shows two large German kilns in Norway originally intended for mixed-feed operation with coke. However, while oil is getting cheaper, coke is becoming more expensive and not always readily obtainable. Therefore, we were asked to adapt these kilns for fuel-oil-firing.

With a kiln shaft of large diameter, this proved quit a task; but conversion was successful. Production from each kiln averages 160 short tons,

*Please turn to page 192*


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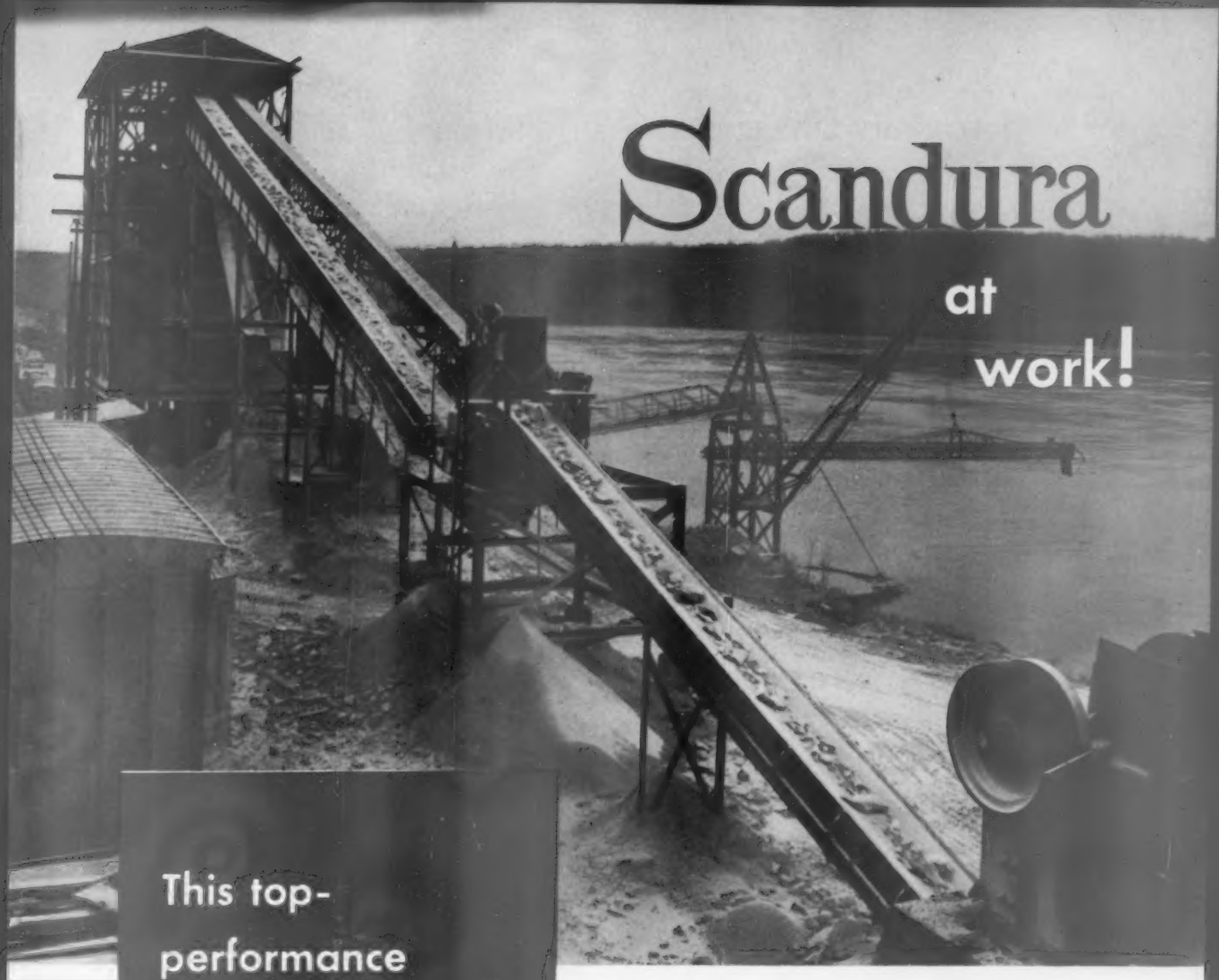

# Scandura at work!

## This top-performance conveyor belting does a standout job in hauling deep-mined Kentucky limestone crushed to 8″ size

These Scandura Gold Line Belts on the operation of a Kentucky producer are delivering typical Scandura performance under rough operating conditions.

The belt in the foreground runs under a primary jaw crusher, receiving the 8″ sized limestone under a drop of approximately 3 feet. The severe impact and abrasive conditions point up the tremendous wear qualities of Scandura Gold Line Belting. Solid woven carcass plus a cushioned cover of tough PVC make a waterproof, fireproof, strip and gouge proof belt that is made to order for the most severe rock products service.

Check us on your requirements, and install a trial length of Scandura Gold Line in your conveyor system. *The performance you can measure is performance that sells!*

***Manufactured by***

**Scandura INC.**

NORTH TRYON STREET AT KESWICK AVENUE • (P. O. BOX 949) • CHARLOTTE 1, NORTH CAROLINA

## HOW FUEL ECONOMY KEYS LIME KILN AUTOMATION

*continued from page 190*

and heat consumption is in the neighborhood of 4 million Btu. per ton. Generally, it tends to less than 4 million Btu. which makes these kilns not only the highest production fuel oil-fired units but, apparently, the most efficient of all kilns.

Hundreds of men have contributed to the developments I have described. There were managements of daring and vision, engineers of great ability and knowledge, operating personnel of determination and interest. They all suffered in occasional mishaps or failures but in the end brought "lime burning" from an ancient art to a reasonably satisfactory technology.

It was a pleasure to have worked with them, and it is a delight to have lived through such a productive period of time. We can all be proud of it and hope that, during the coming era, science and theory rather than empiricism will ever more prevail.

**END**

FIG. 19—Azbe kiln system for dead burning of magnesite installed at Magnesita, S.A., Belo Horizonte, Brazil. Features: (1) stone from quarry, (2) sorting building, (3) magnesite storage, (4) kiln exhaust fan, (5) charging door, (6) $CO_2$ return, (7) producer blower, (8) charcoal-fired gas producer, (9) producer charging hopper, (10) kiln side burners, (11) center burner connection, (12) charcoal haulage, (13) charcoal storage

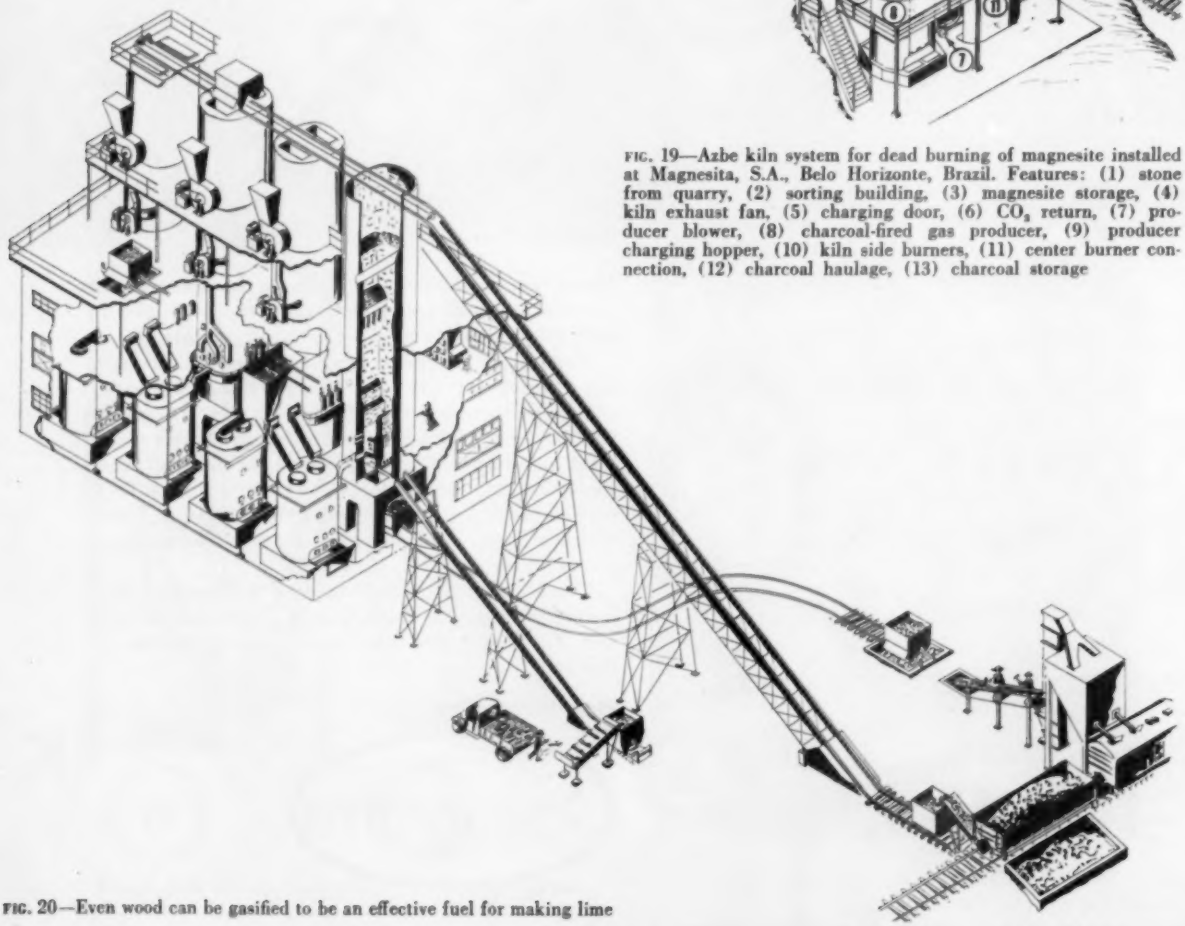

FIG. 20—Even wood can be gasified to be an effective fuel for making lime



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# IT'S THE BIGGEST!

# THE NEW LE ROI 1200 ROTARY

*—world's largest portable rotary air compressor*

*—with cost-saving twin-unit design*

Here's the giant-economy-size portable air compressor that can't be beat for capacity, flexibility, compactness — and certainly not for low-cost air power or money-saving design and performance!

The new Le Roi rotary is a portable cyclone — delivers a full 1200 cfm of air at 100 psi — plenty of power for the *big* demands of pile driving, large-hole quarry drilling, tunnel jobs, multiple pipe line rigs, shaft jumbos, or as a stand-by source of plant air. One 1200 replaces a dozen small portables — eliminates site clutter and the need for extra men and trucks for hauling—minimizes between-job delays and slashes fuel consumption and maintenance.

Twin compressors operate at 1800 rpm, engines at 2000 rpm. Unit weighs 14,700 lbs. dry, has an 18 ft. turning radius, and meets all existing state highway regulations.

Twin-unit design gives you two individually-controlled compressors that can be operated separately for 600 cfm or together for 1200 cfm output. It permits one unit to be shut off when air demand falls below 600 cfm, or for servicing, without interrupting work. Compressors can be alternated to reduce wear — interchangeable engine and compressor parts provide added protection against costly emergency shutdowns in the field.

Get the complete design-performance story from your Le Roi distributor. He'll be glad to send you literature — and even happier to put the new 1200 rotary through its paces for you.

PC-802

**LE ROI** Division of Westinghouse Air Brake Co., Milwaukee 1, Wisconsin, manufacturers of Newmatic air tools, portable and Tractair® air compressors, stationary air compressors. Write us for information on any of these products.

WABCO

U. S. Portland Cement Imports, By Year
(U. S. Bbl. excluding White Cement)

| | |
|---|---|
| 1955 | 4,560,000 |
| 1956 | 3,600,000 |
| 1957 | 3,850,000 |
| 1958 | 3,110,000 |
| 1959 | 4,975,000 |

U. S. White Cement Imports, By Year
(U. S. Bbl.)

| | |
|---|---|
| 1955 | 193,000 |
| 1956 | 300,000 |
| 1957 | 448,000 |
| 1958 | 258,000 |
| 1959 | 280,000 |

U. S. Imports Of Portland Cement, By Month
(U. S. Bbl., excluding White Cement)

| | 1958 | 1959 |
|---|---|---|
| January | 190,000 | 189,900 |
| February | 171,700 | 210,400 |
| March | 181,400 | 237,500 |
| April | 117,800 | 316,500 |
| May | 272,100 | 365,800 |
| June | 178,000 | 613,800 |
| July | 510,900 | 691,300 |
| August | 319,500 | 448,000 |
| September | 306,300 | 651,200 |
| October | 377,600 | 487,900 |
| November | 220,200 | 399,400 |
| December | 265,100 | 363,600 |
| Total | 3,110,600 | 4,975,300 |

U. S. Imports Of Portland Cement, By Country Of Origin
(U. S. Bbl., excluding White Cement)

| | 1958 | 1959 |
|---|---|---|
| Canada | 657,100 | 1,491,200 |
| Colombia | 473,900 | 791,400 |
| Belgium | 410,800 | 581,400 |
| West Germany | 325,100 | 578,600 |
| Sweden | 304,700 | 280,700 |
| Norway | 270,800 | 454,400 |
| United Kingdom | 209,700 | 143,000 |
| Denmark | 192,800 | 129,800 |
| Poland | 68,500 | 42,600 |
| Israel | 58,200 | 349,000 |
| Yugoslavia | 47,500 | 67,400 |
| Egypt | 32,600 | 53,000 |
| Switzerland | 19,500 | — |
| Japan | 18,000 | 100 |
| Mexico | 10,800 | 10,200 |
| Dominican Republic | 7,500 | — |
| France | 3,100 | — |
| Bahamas | — | 2,500 |
| Total | 3,110,600 | 4,975,300 |

U. S. Imports Of White Cement, By Month, 1959
(U. S. Bbl.)

| | |
|---|---|
| January | 16,800 |
| February | 27,100 |
| March | 20,900 |
| April | 11,700 |
| May | 25,100 |
| June | 28,100 |
| July | 28,900 |
| August | 17,200 |
| September | 25,300 |
| October | 20,800 |
| November | 28,100 |
| December | 30,400 |
| Total | 280,400 |

# What about cement imports during 1959?

MURMURS OF COMPLAINT swelled almost to a chorus among United States portland cement producers during 1959 as they felt increasing competition from imported cement. Here was the cause for concern: a dramatic, 60-percent upturn in the quantity of foreign cement entering U. S. markets. Domestic shipments in the same period increased only nine percent.

The influx was concentrated in the eastern half of the nation, and the rise was most noticeable in the last half of the year. Imports, at roughly 5 million bbl., were overshadowed by domestic shipments of 335 million bbl.; however, they inched up rapidly in the percentage column. In 1959, for example, foreign cement received here amounted to 1.5 percent of cement shipped from United States plants. Compare this with the 1 percent ratio of imports to domestic cement shipments in 1958.

**Two major invasions of the U. S. cement market** were staged: Canadian material entered the Chicago area, and cement from several countries moved into the New England states.

Charges of "dumping" were levied. Large imports (virtually all from St. Lawrence Cement Co.'s Clarkson, Ont., Can., plant) into the Chicago area led to legal action before the Interstate Commerce Commission on the Clarkson-to-Chicago rail freight rate. It also led to a complaint of "sales at

*Please turn to page 196*

# HIS LOG BOOK TELLS THE STORY

Dredge of Vincennes Gravel Company, using one of two Thomas Durable Dredge Pumps operated by this company.

J. BRYAN RIDDLE, Pres.-Gen. Mgr.
JAMES E. SMITH, Sec'y.-Treas.

SAND AND GRAVEL PLANTS
VINCENNES, INDIANA
LAWRENCEVILLE, ILLINOIS
CONCRETE PRODUCTS PLANT
VINCENNES, INDIANA

VINCENNES GRAVEL CO., INC.
PHONE TU 2-4520
VINCENNES, INDIANA

January 26, 1960

Thomas Foundries, Inc.,
Birmingham, Alabama.

Gentlemen:

Our first Thomas 8" Pump was installed in February, 1957. In less than 6 months we realized that we should change our 2nd Dredge to a Thomas. Our 2nd Pump was installed in July, 1957.

Our log book shows our Thomas Pumps outlast the old Manganese Pumps a minimum of 2 to 1. This in addition to an increase in our production.

We want to express our appreciation for the timely visits of your representative.

Very truly yours,

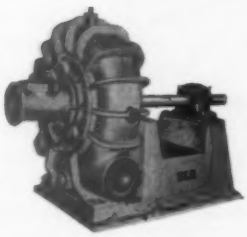
VINCENNES GRAVEL CO., INC.

Bryan Riddle

Bryan Riddle

## Why Mr. Riddle Now Operates TWO THOMAS DURABLE Dredge Pumps

Six months experience in 1957 with a new Thomas Pump, Series HL (8") discharge, made this Indiana Sand and Gravel Company realize that there IS A VAST DIFFERENCE IN PUMPS.



So, President Bryan Riddle installed a second Thomas Pump in July, 1957. Now, 2½ years later, his log book shows that his two Thomas Pumps have much longer life and give increased production. This record of "a minimum of 2-to-1" service life over manganese pumps, is accomplished in a rugged operation at Vincennes Gravel Company in which much of the gravel is large size.

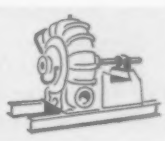
It's the same success story that Thomas Pump users have been telling for years. The INCREASED service life of their Thomas Pumps mean REDUCED maintenance costs, REDUCED downtime and REDUCED delays. The INCREASED production means REDUCED production costs. Net result is INCREASED PROFITS for the Thomas Pump owner.

No wonder sand and gravel operators install MORE and MORE Thomas Pumps every year! It is being constantly stated and proved: — "YOU CANNOT BUY AT ANY PRICE A MORE DURABLE PUMP FOR SAND AND GRAVEL—YOU CANNOT BUY ANOTHER PUMP THAT WILL MAKE YOU AS MUCH MONEY."

Thomas Durable Dredge Pumps are manufactured in range of sizes from 6" to 16" discharge. Write or phone for additional information.

**THOMAS FOUNDRIES Inc.**

P. O. BOX 1111, BIRMINGHAM, ALABAMA



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## WHAT ABOUT CEMENT IMPORTS DURING 1959?

*continued from page 194*

less than fair value" filed with the U. S. Treasury Dept. When the latter agency issued a finding of possible dumping, an investigation of the matter was started by the U. S. Tariff Commission. On March 11, 1960 the Tariff Commission issued a finding of "no dumping" in this case.

Similar dumping complaints were lodged with the Treasury Dept. against Denmark, Israel, West Germany, Sweden and Norway. The complaint against Denmark was rejected, and the others had not been acted upon by the end of the year.

U. S. IMPORTS OF WHITE CEMENT, BY COUNTRY OF ORIGIN, 1959
(U. S. Bbl.)

| | |
|---|---|
| Belgium | 109,300 |
| France | 43,200 |
| United Kingdom | 31,500 |
| Colombia | 25,700 |
| Japan | 23,800 |
| West Germany | 22,500 |
| Denmark | 17,700 |
| Mexico | 6,600 |
| Canada | 100 |
| Total | 280,400 |

**Details on type of cement imported,** customs district of entry and country of origin are compiled by the Bureau of the Census. Three categories of cement are listed: portland (excluding white); white portland, and hydraulic clinker. In 1959, the first category tallied 4,975,000 bbl., compared with 3,110,600 the year before. Comparative figures for white cement for the two years also showed an increase: 280,000 and 258,000 bbl., respectively. For the second year in a row, imports of clinker were insignificant.

**Portland cement (except white) was imported** from 15 countries in 1959. As in 1958, the top four continued to be Canada, Colombia, Belgium and West Germany; all four sent considerably greater quantities than in the preceding year. Some cement was imported from Poland, an Iron Curtain country, but none of it entered Florida where, in 1958, a furor followed the landing of some Polish cement.

Florida remained the principal customs district of entry for imported cement, but the absolute quantity (1,291,200 bbl.) entering the state was slightly lower than that of 1958. Florida's share of the total imports declined from 48 percent in 1958 to 26 percent in 1959.

An estimated 600,000 bbl. (most of which entered the U. S. at Port Huron, Mich.) was shipped into the Chicago area via rail, beginning about May, and via lake vessel in the last quarter of the year.

The Massachusetts - Connecticut - Rhode Island area received 1,545,000 bbl. in 1959, more than double the year-earlier amount. This cement originated in several countries, the biggest exporters being Norway, West Germany, Sweden, Israel and Belgium.

About 705,000 bbl. of Canadian cement entered the Rochester-Buffalo area, 320,000 bbl. of Colombian cement entered Puerto Rico, and 156,000 bbl. (mainly from Colombia and West Germany) entered New York City.

Imports along the gulf coast and in the West were very small.

White cement was imported at a fairly uniform rate, the monthly quantity varying from 11,700 bbl. in April, to 30,400 bbl. in December. The United States imported white cement from nine countries in 1959. Belgium led with 109,300 bbl.

Florida took more than two-thirds of the total imports of white cement, as usual. Of the 196,500 bbl. entering Florida, 101,700 bbl. originated in Belgium, while France, United Kingdom and West Germany supplied sizable amounts. Besides Florida, only Los Angeles (34,000 bbl.) and Puerto Rico (27,000 bbl.) imported appreciable quantities of white cement. Interestingly enough, additional domestic white cement production has recently been announced for Florida and California.

**Clinker imports were the lowest in many years,** totaling only 6,000 bbl. (United Kingdom, 3,300; West Germany, 2,100 and Yugoslavia 600.) This material entered New York, Philadelphia and Baltimore; it is believed that none of it was used in the manufacture of standard portland cement.

A look at 1960 in the light of the above statistics reveals almost a certainty that imports of nonwhite portland cement will continue to show an increase over the comparable period of 1959, at least during the first six months.

If the new Dundee, Mich., plant is successful in moving quickly into its projected market, imports from Canada into Chicago could possibly drop off sharply within a few months. But in contrast, there is a great deal of new excess productive capacity in eastern Canada. These producers are as close to the rich markets in New York and New England as many domestic producers. It is conceivable that more Canadian cement will move into this area in greater volume from now on. END

# "My Boss Read the Specs with Tears in His Eyes"

He looked like he'd lost his best friend — money.

"Goodbye contract," he said quietly. "We just can't hope to meet these government specifications for aggregate."

"Yeah, it's pretty hopeless with our set-up. Of course, if we had a hydraulic classifier — " (I was kidding.)

"You're out of your mind. Around here water costs more than sand."

"Well how about an air separator, like Sturtevant makes?" I shot back. "Pete's brother runs a pit at Rapid City and says they clean sand without water. By de-dusting it."

He was skeptical. "Aren't Sturtevants for cement?"

I nodded. "They are, but you see quite a few in aggregates, too, nowadays. Might be worth a try."

The Boss smiled for the first time that morning. "What the heck are you waiting for? Get 'em on the phone and let's see what they can do."

So we got the contract, thanks to the 12 ft. Sturtevant we now use for de-dusting and pre-classification. It's a beaut. Gives good service outdoors the year round, with no protection except for the motor housing.

If you're in this business, Brother, it might pay you to have a good long look at what a Sturtevant can do for tight aggregate specifications.

**Sturtevant Air Separators** classify production loads up to 150 tph by exact control of air currents and centrifugal force. Simple, quick adjustments make possible the selection (or rejection) of particles in the 30 to 400 mesh range. Nine standard models available, varying in size from 3′ to 18′.

**Learn how a Sturtevant Air Separator can help your aggregates production. Write today describing your needs. Address: Sturtevant Mill Co., 102 Clayton St., Boston 22, Mass.**

## STURTEVANT AIR SEPARATORS CLASSIFY SAND WITHOUT WATER

**PRODUCING CLEAN SAND,** the Sturtevant acts as a de-duster by removing fine mesh particles from the throughput. Particularly valuable where water is limited.

**EASING SCREEN LOADS,** the Sturtevant rejects unwanted fines and circuits coarser sizes to screens for grading. By this pre-classification, the possibility of blinding screens with fines is minimized and output considerably increased. Also, excessive dust problems are eliminated.

**WHEN BLENDING IS NECESSARY,** the Sturtevant selects fines from the crushing operation. This stockpiled product then can be used in the blending operation to overcome fineness modulus deficiencies.

GRINDERS
CRUSHERS
PULVERIZERS
MICRON-GRINDERS

# STURTEVANT MILL CO.

***Dry Processing Equipment***

MIXERS
BLENDERS
ELEVATORS
AIR SEPARATORS

**The "OPEN-DOOR" to *lower* operating costs over *more* years**

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how COLUMBIA ingenuity and armor-tough manganese steel crusher parts increased production 30%, jaw life 75%, on rugged Utah job...

This detailed case history describes amazing accomplishments for Salt Lake County; in Columbia Field Report No. 501. Send for your Free copy.

FIELD REPORT

Columbia's complete line of ARMOR-TOUGH crusher parts provides more wear where it counts, where rock meets metal. For greater production, longer life, specify COLUMBIA.

Columbia

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933 N.W. Johnson, Portland 9, Oregon

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## ROCKY'S NOTES

*continued from page 16*

**Hydrated cement and concrete:** To us the most interesting and helpful part of Dr. Brown's article is his discussion of the microscopic study of hydrated cement and concrete. We can touch on only a few high points, which is regrettable, because all of it would prove most interesting to our readers who have not read the original. He explains how the addition of water generates two recognizable new products: "calcium hydroxide [$Ca(OH)_2$] which starts to develop in open water space and tends to grow into large, clear crystals. Mineralogical identification of the other is not so easy. It is a precipitate, in very minute units, that forms on and adheres to exposed interfaces. In structure, the precipitate looks very much like a random pile of uniformly sized spheres, hence with a significant bulk porosity, but all of a very minute detail. From this structure it is designated a gel."

Dr. Brown then explains that this precipitate continues to deposit on itself and on the calcium hydroxide crystals, formed and forming in the water between the cement particles. This intergrowth of calcium hydroxide crystals and partly hydrated cement particles accounts for the hardening and strength of the set cement. There are also precipitates of calcium aluminates and sulfoaluminates mixed in, but they cannot be identified because their optical properties are too similar to those of the calcium hydroxide. Of course, some proportion of the cement remains unhydrated and, subsequently, is really only an aggregate. This being so, the thought has often occurred to us: Why is not some other, more stable aggregate—such as finely pulverized silica or limestone—just as effective for the deposit of this gel precipitate?

Apparently such an "adulterant" is thus effective, for Dr. Brown himself says: "Sometimes in concrete technology other powdered materials enter as components with attendant decrease in proportion of cement. Some examples are fly ash, blast-furnace slag (quenched or otherwise) and pulverized limestone. One may not conclude that such entry necessarily is adverse to strength development." He does say that adverse results can come from too much dilution of the cement. We think this is quite a concession considering the industry's long opposition to any use of such "adulteration" of their product. Again, we would like to remind our readers of an opinion frequently expressed in these columns that obviously the industry could accomplish the same end result by putting more silica in the raw mix. Even if it remained free silica, if as finely ground as the clinker, it would be useful, although probably it would also increase the cost of grinding and slow the hardening time.

*Please turn to page 200*



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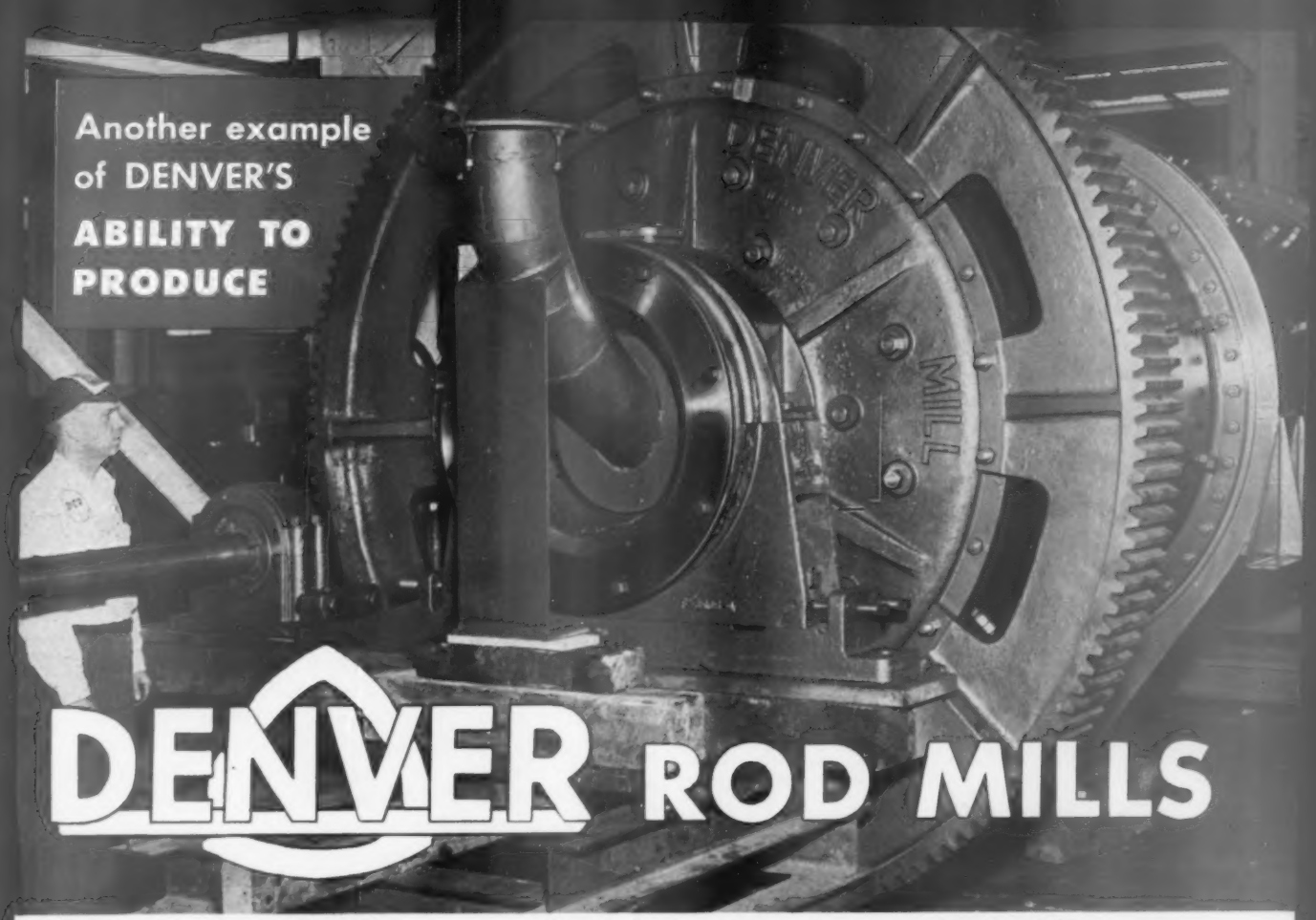


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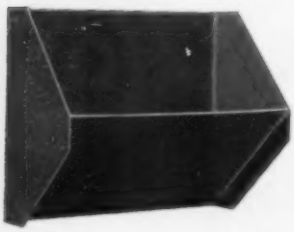

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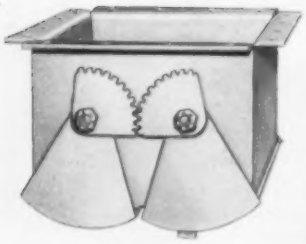

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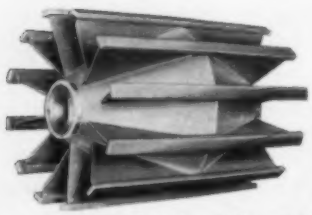

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## ROCKY'S NOTES

*continued from page 198*

Regarding the quality or property of dimensional constancy, Dr. Brown says this must reflect the closely related properties of strength on one hand and durability on the other. Further, we quote him: "Over-all dimensional constancy reflects a state of equilibrium, a stability of the components of the material, both within as between the components, and outwardly as between the components and the environment. With natural stones, both considerations are taken for granted, the more so perhaps for the inner equalibrium. In other words, conventional petrography has devoted little critical attention to these properties." He then explains how concrete comes into existence through the extensive series of chemical reactions we are all more or less familiar with. He says, further, something we all know from experience: that not all such chemical reactions are beneficial to the concrete; and he gives familiar examples.

Microscopic study designed to determine the reason why some concrete is good and some poor, Dr. Brown says, is attended by difficulties. We quote as follows: "Petrographic microscopy has done very well in looking at poor or failed concrete to learn why it was poor or had failed. Looking at good concrete to learn why it is good is a more difficult problem." Continuing further on, after explaining some causes for instability of the material structure, Dr. Brown concludes: "That malperformance is traceable almost wholly and in almost every case to such conditional features as (1) slighting of cement content; (2) excess mix water; (3) aggregate that is unsuitable, with respect to gradation, absorption, cleanliness or composition; (4) improper placement or finishing; (5) improper protection against early freezing; (6) lack of air entrainment, etc."

Of course these conclusions offer nothing new—

*Please turn to page 202*

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*(The only Jig that will treat fine aggregates.)*

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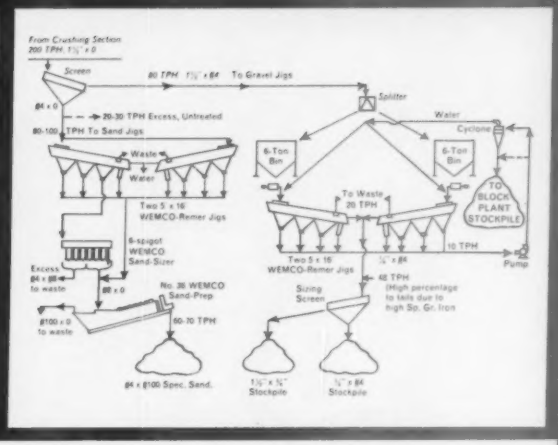


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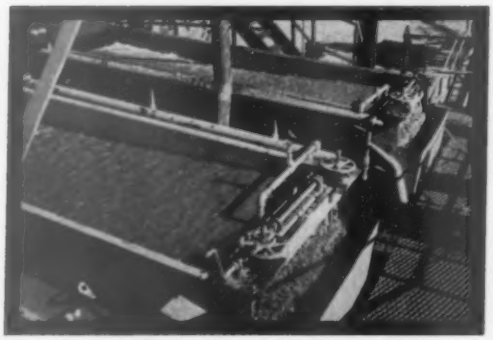

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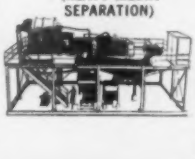

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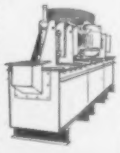

PUMPS

## ROCKY'S NOTES

*continued from page 200*

and are conservative, as coming from a cement industry source. The most interesting feature of the discussion to us is the rather guarded inference that cement and concrete as ordinarily made contain components inherently unstable, as for example, the unhydrated cement and the crystals of hydrated lime (calcium hydroxide) merely encased (temporarily?) in a shell of hardened gel or paste. The part that these unstable components play in concrete disintegration, if they do play some part, is the interesting problem to be solved.

**In our own mind the primary reason** for the durability of some such natural building material as limestone is because its components are interiorly stable, while the interior components of concrete are not. Both, when subjected to the same environmental conditions, will show that the interior stability of the limestone—the fact that the static electric charges on the calcium and carbonate radical ions balance (plus and minus), must certainly be an important factor; while in concrete they are not balanced, under many conditions of exposure, due perhaps chiefly to the excess $Ca(OH)_2$ and to the unhydrated cement. **END**

## ABOUT THE NEW LABOR LAW

*continued from page 151*

3. Obtain and study carefully a complete copy of the new law.

4. Consult with legal counsel on any question about the law relating to his business—particularly in regard to the reporting of payments in addition to wages being paid to employes.

The effect of the new law on the rock industries remains to be seen. Some provisions—particularly in the area of secondary boycotts—are certain to be helpful. Others, especially those involving special privileges to unions in the building and construction industry, may offer some serious problems. It's still too soon to tell. Yet, in general, things have gone more smoothly than expected since passage of the bill.

The hopeful outlook is summed up by Secretary of Labor Mitchell this way: "No honest trade union or employer has cause to fear this legislation. It will not be used to bust unions or harass management. It will be used only to help labor and management clean their ranks of corrupt elements."

These are noble sentiments. Rock producers can only wait and hope that Secretary Mitchell is right. **END**


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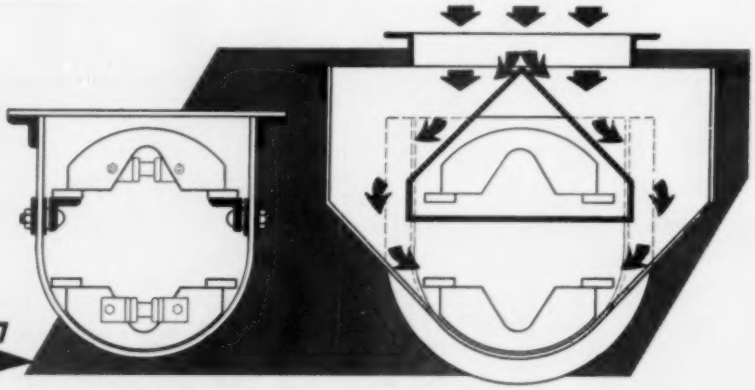

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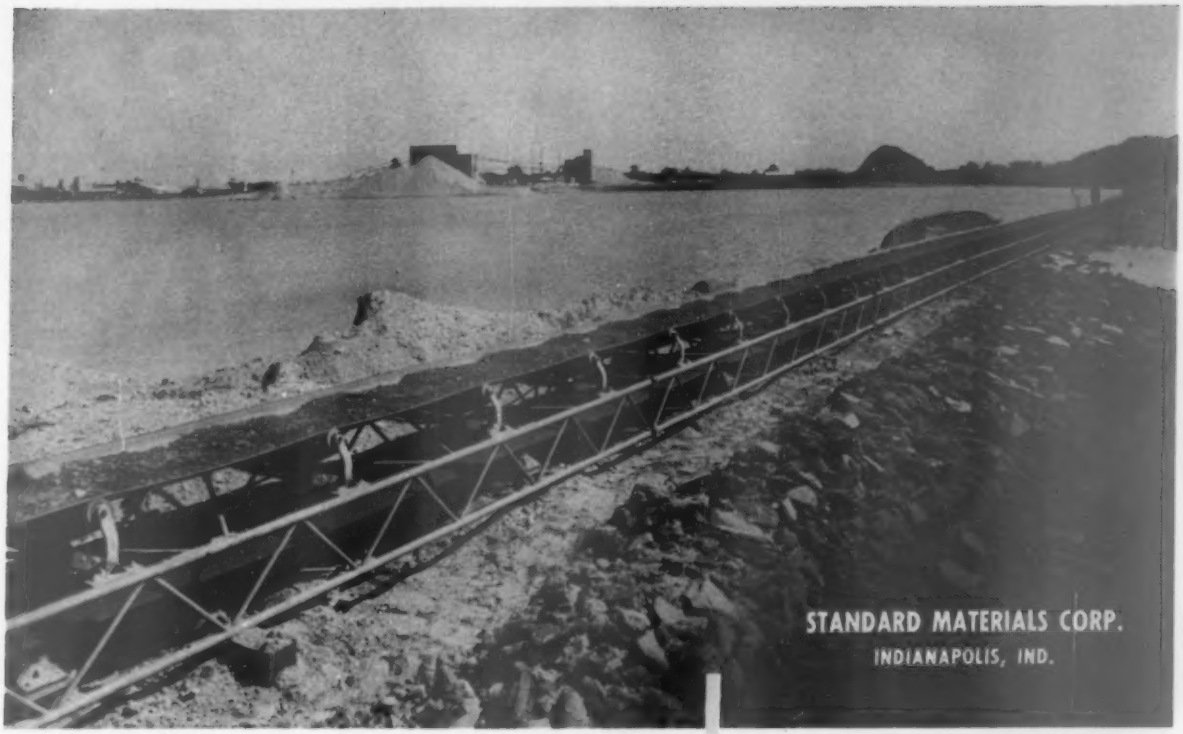


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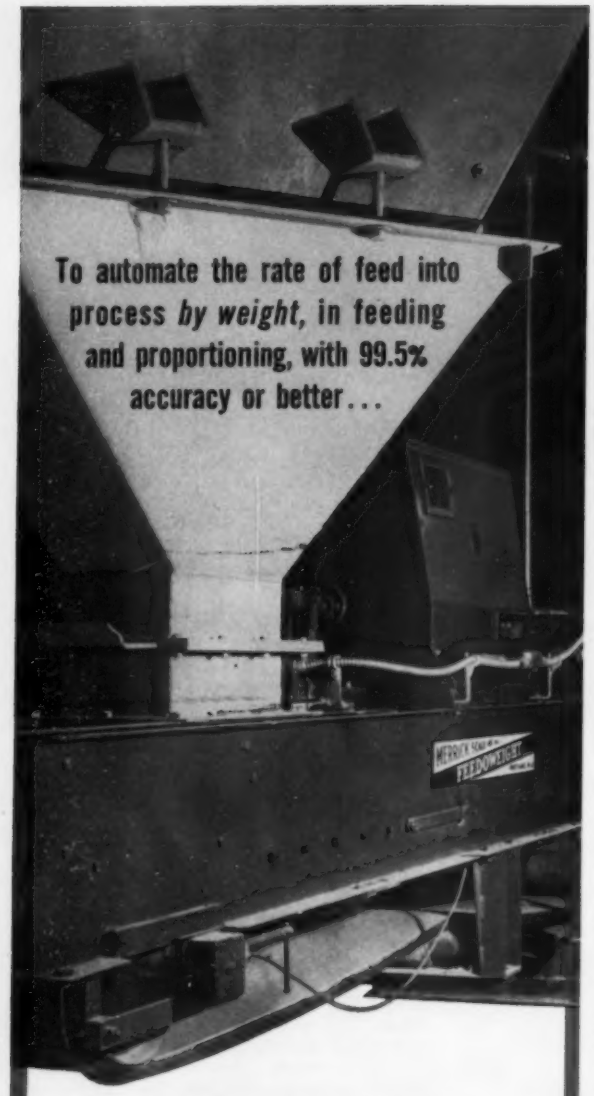


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## WILL EXPANSION BRING PROSPERITY?

*continued from page 97*

**(5) Finance.** A big challenge to management will be how to provide nearly $3 billion for capital investment the next 10 years, assuming the estimated growth pattern is valid. Capital for expansion must be made available from profits, depreciation reserves, borrowing or stock issues. It would appear that the industry should strive for a more equitable depreciation arrangement by a change in federal law.

The estimated industry growth during the 60's depends in great part upon the direction the federal government moves regarding political philosophy and national financing. Of course, our qualifications for predictions in that area are so limited that we must leave that phase to experts.

It is assumed, based on past history, that our economy will advance at an average annual rate of four percent. In any event, the cement industry growth will follow the pattern of national growth in direct proportion to construction needs and demands, excepting a possibility of involvement in war. **END**

## NEW APPROACH TO CEMENT SPECS

*continued from page 162*

pattern proved to be more successful in use than all other available cements. Its sieve analysis corresponded to: plus 200, 1 percent; plus 325, 20 percent; Pan, 79 percent.

The other cements were ground to this sieve analysis, the Blaine remaining the same at 2,850 sq. cm./g. In use the cements behaved as one—previously observable behavior differences had been eliminated. *Please turn to page 206*

"DIG ON THIS SIDE SO IT'LL FALL INTO THE TRUCK"



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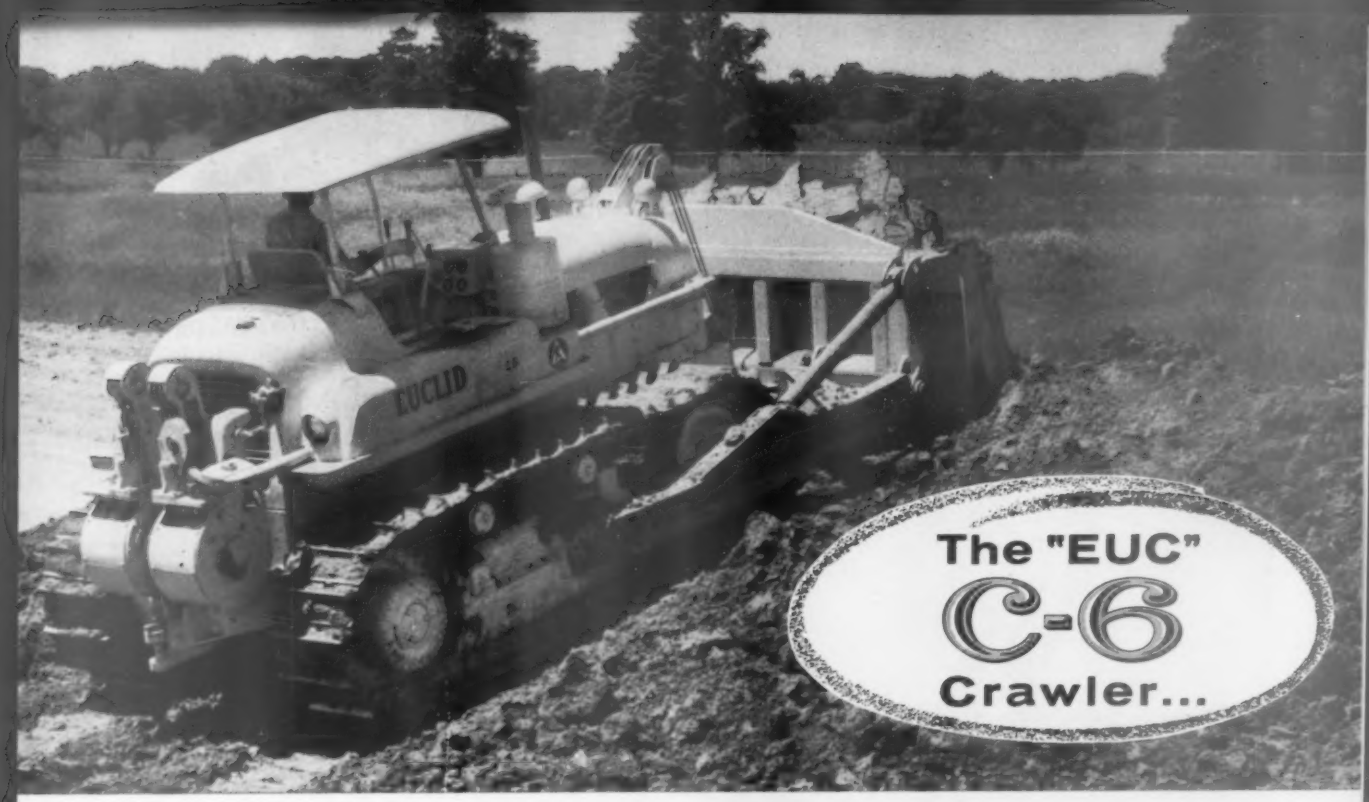


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***Proven Torqmatic Drive*** . . . performance tested and proved in thousands of Euclid earth-movers on the toughest jobs.

***Full Power Shift*** . . . no master clutch . . . easy operation and "fast as a fox" maneuverability that cuts work cycle time.

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No other Euclid product has ever had the thorough testing —both on proving grounds and on actual jobs—that the C-6 tractor has undergone during the last 5 years. All of the product refinements and improvements resulting from this exhaustive test program, plus Euclid's really new concept of crawler design, make C-6 performance a new standard for comparison in the 200 h.p. tractor class.

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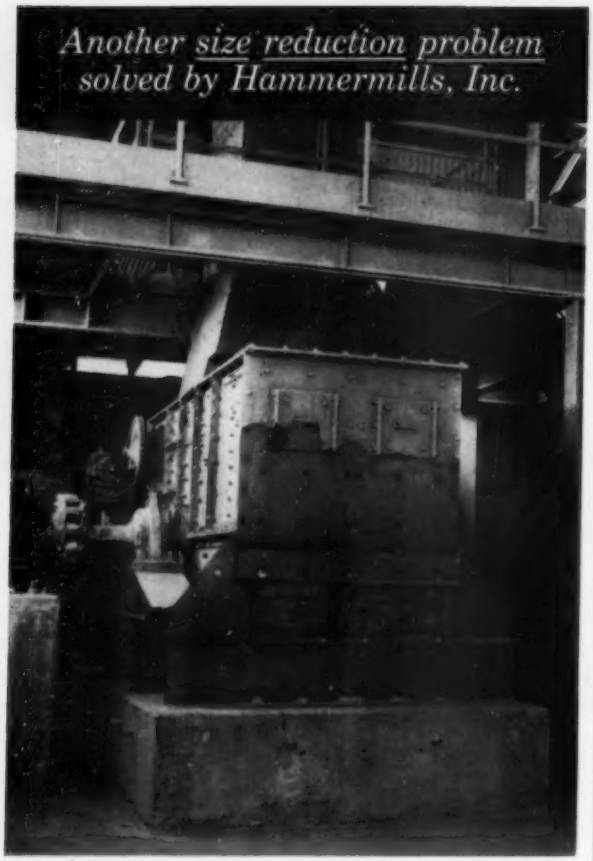


*Bulldog Non-Clog Hammermill*

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Limestone fed to this primary Hammermill at a new Midwestern cement plant contains 12% silica. It is mixed with clay and is high in moisture. The Bulldog Non-Clog Hammermill crushes this material at a rate of 375 to 400 tons per hour with a power consumption of 600 h.p.

Bulldog Non-Clog Hammermills are known throughout the industry for their ability to handle tough jobs. They'll give more capacity per horsepower. They require less maintenance.

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## NEW APPROACH TO CEMENT SPECS

*continued from page 204*

I gathered sufficient data by plotting numerous particle-size distribution curves and recording the surface area to establish that cements could have particle-size distributions varying over a wide range. This is where I envisaged the new approach, using the law of mass action and the principles of statistical control. So far, as those familiar with the latter will observe, the tests had shown that particle sizes did not follow a normal distribution curve.

A normal distribution curve not only was possible, according to the data; it was desirable from every chemical and physical aspect. I plotted one and extrapolated the two most readily determined parameters—that is, the requirements on the plus 200 and the plus 325-mesh screens. This worked out to be: plus 200, 1 to 2 percent; plus 325, 30 to 40 percent; Pan, 50 to 60 percent.

**From a consideration of the law of mass action,** a cement having the above normal particle-size distribution at 2,850 sq. cm./g. Blaine would be slow in reaching adequate working plasticity. To correct this, I increased the surface area to 3,100 sq. cm./g. A further consideration, designed primarily to include the principles of compaction and water retention, was to increase the plus 200 to 5 to 10 percent. The final specification became: Type 1 portland cement ground to 3,100 sq. cm./g. It had this sieve analysis: plus 200, 5 to 10 percent; plus 325, 30 to 40 percent; Pan, 50 to 60 percent.

I already have told you how successful this has been. The advantages realized in water retention, plasticity, temperature stability and improved strength, when translated into plant operations, leave no doubt of the efficacy of the method.

In the past, time required for concrete mixing and forming was uncontrollable. Apparently cements consisting principally of fine particles go rapidly through the solution and plastic phases. Under optimum conditions they would reach the granular hydrating phase in 20 to 30 min. Where the grind follows a normal distribution curve (all other values being equal), there is a buffering action by the predominating proportion of larger (albeit, reactive) particles.

While the neighboring cement manufacturers are not entirely in favor of such a radical change, there has been over the last year or so a tendency on their part to move to a higher Blaine—3,000 and above—and improve their particle-size distribution. How far they can go economically in the latter before substantially modifying their present grinding equipment remains to be seen. Experience with their "near approach" to this new grind may decide. **END**

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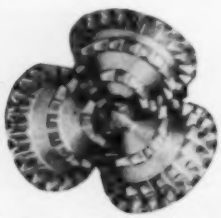

Varel type VH2 offers fast penetration rates yet provides long life in medium hard abrasive limestones. Plus factors are large rugged bearings and "Varelloy" reinforced "T" teeth on gauge row.

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# NEW LITERATURE

FOR FREE INFORMATION on these items, simply fill out and mail postage-paid Reader Service Card found elsewhere in this issue

### Centrifugal cloth collector

DUSTEX CORP. is distributing Bulletin 10-27-59 on its Roto-Jet cloth dust collectors. Combining the action of a cloth collector with the centrifugal action of a cyclone unit, the Roto-Jet reportedly has unusually high air/cloth ratio and takes less space.

A rotating blow tube and roller support system give the fabric a reverse bending action, aiding particle removal; the system also requires no reversing mechanism. Capacities from 2,000 to 20,000 cfm. are available by using various combinations of three collector sizes.

*Enter 500 on Reader Card*

### Speed reduction

METHODS OF SPEED reduction with compact, shaft-mounted units in a wide range of sizes and horsepowers are described in a new 64-page bulletin by Dodge Mfg. Corp. Bulletin #A692 also presents reducers for flange mounting, vertical shafts, right angle drives and screw conveyor drives.

Construction details, dimensions, prices and installation information are given in sections illustrated with photographs and engineering drawings. Tables are included for selection of reducers for various applications.

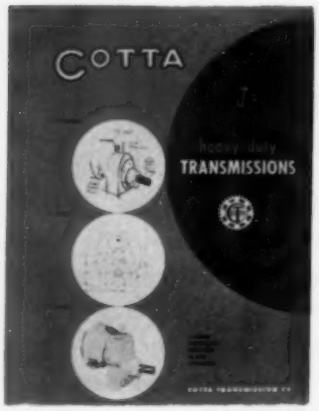
*Enter 501 on Reader Card*

### Multiple-tube cooler

HOW ALLIS-CHALMERS' multiple-tube cooler (Warner type) operates to save money five ways is told in a new leaflet released by the company. This cooler is designed to provide low-cost cooling of fine, soft or granular materials, including lime, dolomite, magnesia, alumina and clays.

*Enter 502 on Reader Card*

### Transmissions




STANDARD TRANSMISSIONS customized to each application is the theme of an 8-page brochure released by the Cotta Transmission Co. Described are heavy-duty transmissions with input torque capacities of 150 to 2,500 ft.-lb. Examples of standard single speed, multiple speed and right-angle drives are illustrated, with complete lists of input torque capacities, speeds and gear ratios.

A variety of custom-designed transmission applications—from crash trucks to construction equipment—are shown with summary descriptions. Also described and illustrated are various transmission arrangements for rotation, location, speed, shifting, cooling, mounting, clutches and output shafts.

*Enter 503 on Reader Card*

*(Continued on page 210)*

# Idler questions? H-R has the answers!

At last! A truly comprehensive book on belt conveyor idlers that answers *all* your questions. The new Hewitt-Robins "Belt Conveyor Idlers" book is one of the most complete ever offered to industry. In it you'll find:

- More than 80 helpful graphs, sketches, tables, charts; 150 illustrations; 48 pages of detailed information you can use.
- Comparison of ten competitive idler designs.
- Answers to questions frequently asked about idlers.
- Engineering information on belt speeds, conveyor capacities, idler spacing, and other factors you must consider in selecting idlers.
- Complete explanation of 14 basic types of idlers manufactured by H-R to fit every belt conveyor need.
- Tips on how to extend the life of idlers.

For your copy, consult your H-R representative, or write Hewitt-Robins, Stamford, Connecticut. Ask for Bulletin 5-19.

**HR HEWITT-ROBINS**

*The name that means everything in bulk materials handling systems . . .*

CONVEYOR BELTING AND IDLERS • INDUSTRIAL HOSE • VIBRATING FEEDERS, SCREENS & SHAKEOUTS • POWER TRANSMISSION EQUIPMENT

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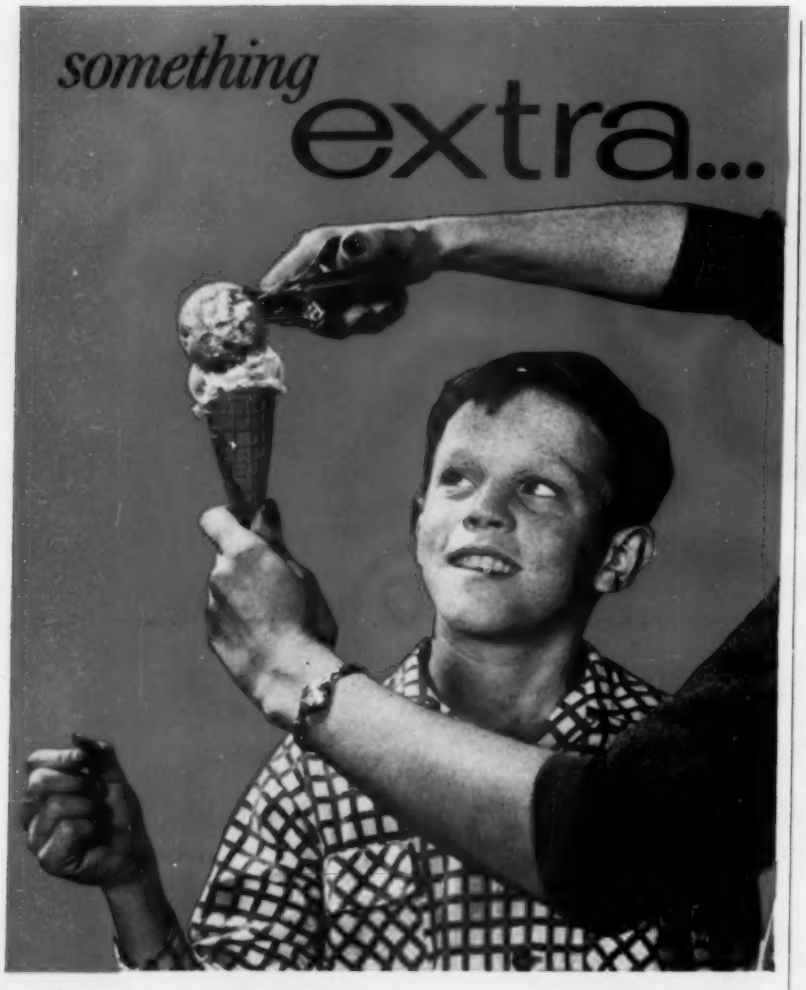


*that's what you want in a fuel...*

*what you get in B&O Bituminous!*

Sure, bituminous coal is power-packed—it's prepared to suit any industrial utilization—its source is most convenient to industry. But, bituminous gives you the *extra* that no other fuel can—*nearly inexhaustible reserves, always available!*

**B&O** BITUMINOUS COALS FOR EVERY PURPOSE

*Ask our man!* BALTIMORE & OHIO RAILROAD
BALTIMORE 1, MD., Phone: LExington 9-0400

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## NEW LITERATURE

*(Continued from page 208)*

### Screw conveyors

A COMPREHENSIVE BOOK devoted to the versatile applications and selection of screw conveyors, screw feeders and components has just been released by Link-Belt Co. The 76-page book, #2989, illustrates over 20 different types of screws, 14 types of troughs, with 4 types of covers, 5 types of discharge openings and 2 types of feeders. The book also contains an extensive list of materials for which the conveyors may be used.

**Enter 504 on Reader Card**

### Mobile crane

A COLORFUL, NEW, 12-PAGE CATALOG gives full information about the 15-ton Unit Model 357 Mobile crane, which is easily converted to a ⅝ yd. clamshell or dragline. Some features described are two-pin adjustable, double telescopic outriggers, full-time hydraulic power steering, one-piece alloy steel turntable gear and roller path, twin hook rollers and powerful air brakes on all wheels. Unit Crane & Shovel Corp.

**Enter 505 on Reader Card**

### Lubrication systems

A NEWLY REVISED general brochure now contains information on the complete line of centralized systems of lubrication offered by Farval Div. of Eaton Mfg. Co. The booklet, #26-T, has been increased to 24 pages to cover new additions to the Farval line. Centralized lubrication and principles of operation are discussed, as well as system components. Illustrations of typical applications are also included.

**Enter 506 on Reader Card**

*(Continued on page 212)*



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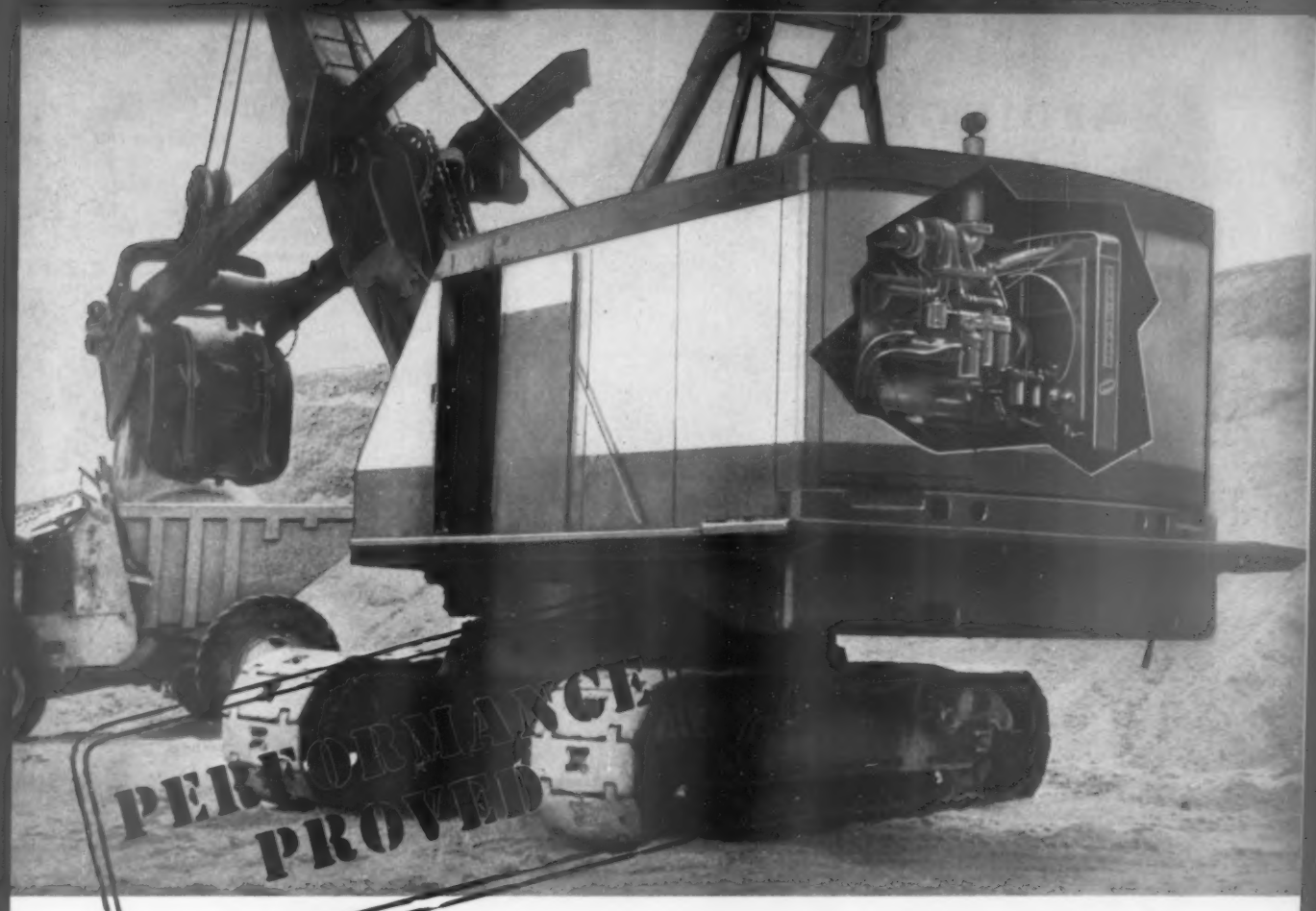



# "We tried burying the bucket in the bank but couldn't... thanks to that 21000 diesel"

— That's a comment on performance of the Allis-Chalmers 21000 diesel repowering a 2½-yd shovel belonging to the Electro-Metallurgical Co., Ltd., Killarney State, Ontario.

PERFORMANCE PROVED

**"It now seems to have twice the power,"** says the operator of a Pennsylvania-owned machine in which a 16000 diesel replaced the original engine of another make.

PERFORMANCE PROVED

**"17% less fuel, 30 minutes less trip time"** — These are the savings effected when a 21000 diesel repowered a truck operated by a logging company in Idaho.

PERFORMANCE PROVED

**"Plenty of reserve, with economy and dependability to boot,"** states the owner of Minnesota Construction Company, who has several pieces of equipment powered by 16000 and 21000 diesels.

"We can hardly believe the fuel economy" — "'Startingest' engine we ever had" — "Don't understand why anyone would want an old-fashioned 'smoker' again," comment others. Everywhere, on every type of installation, the amazing 16000 and 21000 are "performance proving" their greater economy, their top usable power, their superior starting. If you want diesel advantages like these, see your Allis-Chalmers dealer for details. Allis-Chalmers, Milwaukee 1, Wisconsin.

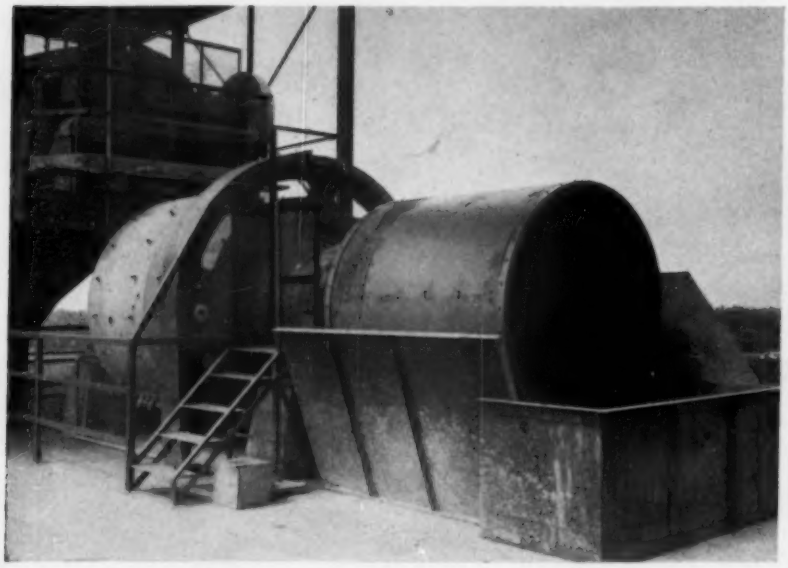
**ALLIS-CHALMERS**

***POWER* FOR A GROWING WORLD**

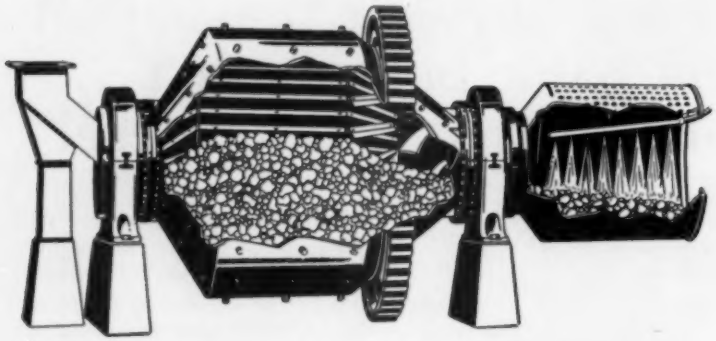
A-C ALLIS-CHALMERS

BC-25

# HARDINGE SCRUBBERS FOR PIT-RUN MATERIALS



**The 8' x 48" Hardinge Conical Scrubber, above, with 6' x 6' dewatering screen kept a west coast sand and gravel firm in business, after their high grade deposit was exhausted—successfully removing large quantities of extremely sticky clay from their quarry stone. Hardinge Conical Scrubbers are in operation throughout the country, cleaning crude iron ore, sand, gold ore, dolomite, river gravel, and crushed stone of all types.**



**Large diameter, short length trunnions permit chute feeding of unsized ore and rock at rates up to 600 tons per hour.**

**The mass loading and ball-mill action in the scrubber quickly and completely slurries the clay and dirt, permitting ready separation on washing screens or trommels.**

**Write for Bulletin 37-B-7**

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**COMPANY, INCORPORATED**

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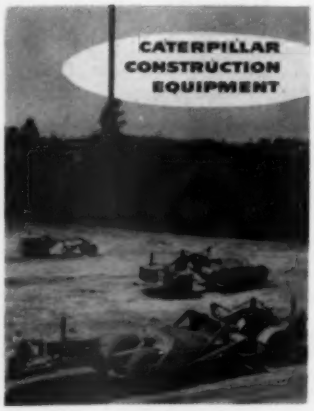
## NEW LITERATURE

*(Continued on page 210)*




### Construction equipment

A HANDY REFERENCE CATALOG, #D942, on the company's complete line of earthmoving equipment and diesel engines has just been released by Caterpillar Tractor Co. The brochure contains model views and brief specifications of motor graders, track-type tractors, bulldozers, rippers, scrapers, wheel tractors and wagons.

*Enter 507 on Reader Card*

### Chain and sprockets

DODGE MFG. CORP. has released a 56-page bulletin describing roller chain and sprockets. Photographs and diagrams show construction details, complete with selection data and list prices. Bulletin #A691 also includes general information on the installation of roller chain drives, calculation of center distances, horsepower ratings, conveyor engineering and instructions for lubrication and maintenance.

*Enter 508 on Reader Card*

### Motor crane

THEW SHOVEL CO. has issued a four-page bulletin on its new model of motor crane. Machine features hydraulically operated outriggers as standard equipment.

*Enter 509 on Reader Card*

### Dust control brochure

"FREEDOM FROM DUST" is the title of a new 28-page brochure just published by Dracco Div. of Fuller Co. Bulletin #805 describes a complete

range of dry collection equipment. Shown are the ways of using cloth filtration and cyclonic equipment for eliminating dust control and air pollution problems in industry. Illustrated application data shows how industry uses this equipment effectively to collect waste dust or to return valuable, reusable material to the manufacturing process.

*Enter 510 on Reader Card*

### Crawler tractor

THE INTERNATIONAL DIESEL crawler tractor is the subject of a 3-color, 24-page catalog just issued by International Harvester Co., Construction Machinery Div. Illustrated with photographs and cutaway diagrams, catalog #CR-791-I depicts highlights of the torque converter and gear drive versions of the 230-hp. engine.

*Enter 511 on Reader Card*

### Blow-off systems

U. S. HOFFMAN MACHINERY CORP. has released a guide to designing low-cost air supply systems for blowing off chips, dust and other particles from machine surfaces. The design guide includes information on the relative performance of pressure systems and shows how a more effective blowing job can be accomplished with much less power ouput.

*Enter 512 on Reader Card*

### Dust collector

DUSTEX CORP. recently released a bulletin describing the new Dustex "1600" dust collector.

The cyclone tubes are mounted between the inlet and discharge tube sheets making possible an unobstructed inlet plenum preventing material buildup and plugging. The tubes, surrounded by cleaned system gases, are maintained at system temperatures reducing or preventing condensation.

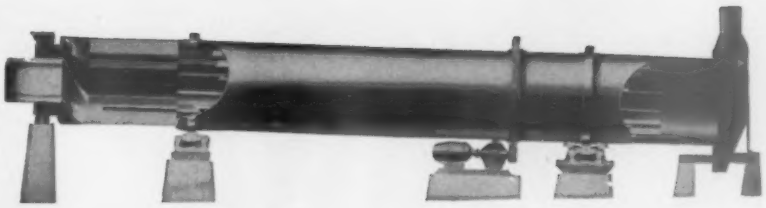
*Enter 513 on Reader Card*

### Car shaker

ALLIS-CHALMERS MFG. CO. has released a bulletin describing the advantages of their 3½-ton car shaker. This shaker is specifically designed for plants where unloading of hopper-bottom cars does not warrant installation of Allis-Chalmers 5-ton unit and where smaller capital investment is desirable.

*Enter 514 on Reader Card*

*(Continued on page 215)*

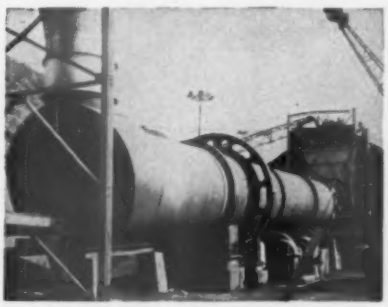
Interior of shell of "XH" Ruggles-Coles Dryer showing lifting flights and feed spirals.

from **Alumina ores** to **Zircon concentrates**

. . . in the drying of ores and concentrates. That is the story of Ruggles-Coles "XH" Dryers.

Small or large, each dryer is designed for the specific requirements of the user with the knowledge and experience gained from hundreds of installations.

Complete specifications upon request. Ruggles-Coles Dryers are described in Bulletin AH-438-7.



10′ diameter, 80′ long "XH" Ruggles-Coles Dryer drying bauxite in Jamaica.

Four 80″ diameter, 60′ long "XH" Ruggles-Coles Dryers handling asbestos ore in Canada.

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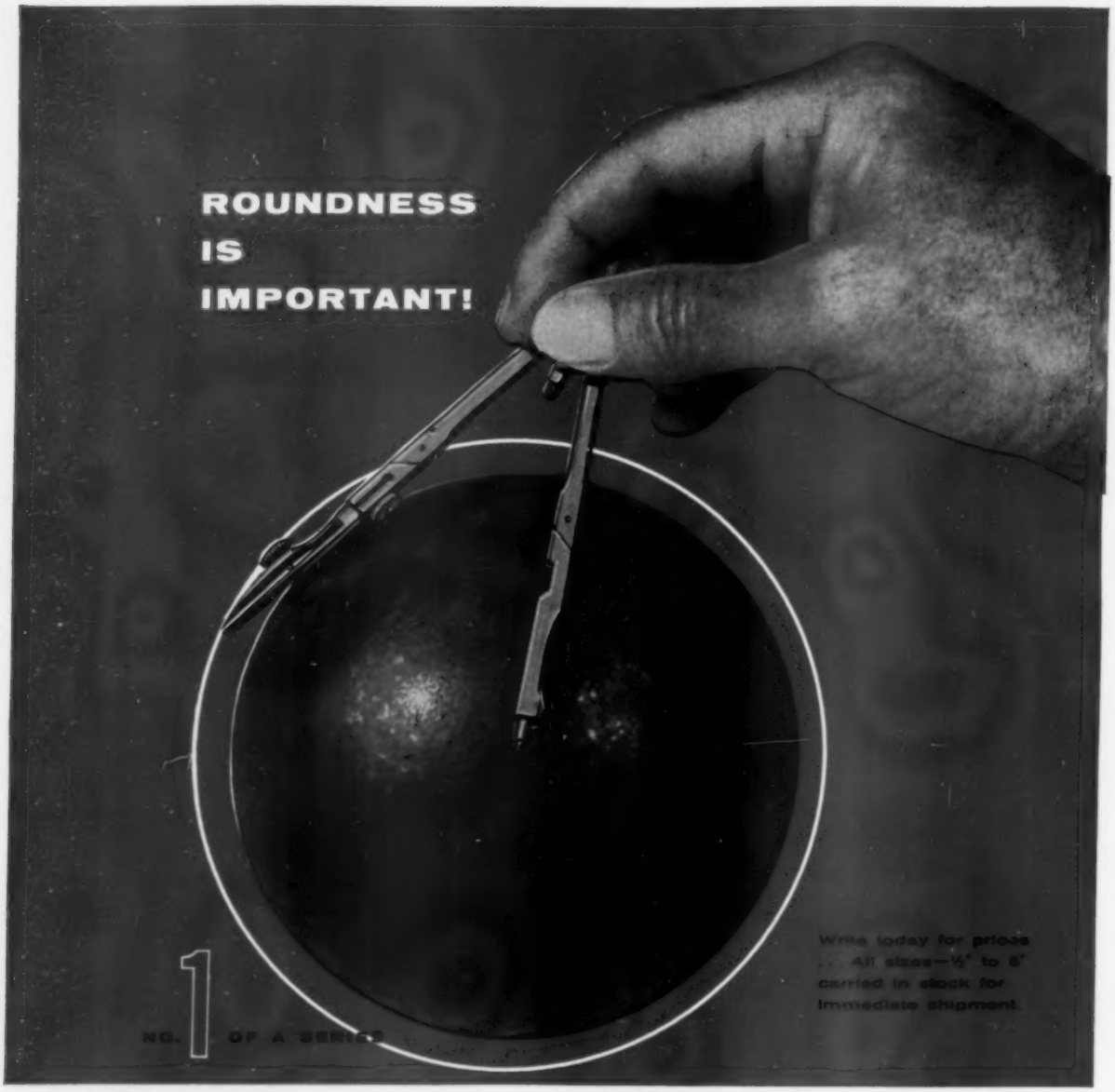


The more perfectly round a grinding ball is the better it grinds and the longer it lasts—deviations reduce its efficiency. Coates has established a reputation for the roundness of its Carbex Triple-Forged Grinding Balls which dates back to 1918 when they patented a process for the first round grinding ball. Great care and skill are employed in the manufacture of these superior products. More perfect sphericity assures you a ball that wears evenly and grinds better, longer. Continued checks and calibrations throughout the manufacturing process protect the high standards and assure uniformity.

Coates Carbex Grinding Balls are made of fine-grained, high-carbon steel. Scientifically heat treated to the core, they are hard, to last longer and to grind better; tough, to avoid shattering under stress of milling. Call for Coates Triple-Forged Carbex Grinding Balls . . . built with care for longer wear.

COATES STEEL PRODUCTS CO. CARBEX TRIPLE-FORGED BALLS

C857-3

COATES STEEL PRODUCTS COMPANY

GREENVILLE, ILLINOIS

LARGEST EXCLUSIVE MANUFACTURER OF GRINDING MEDIA

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## NEW LITERATURE

*(Continued from page 213)*

### Permanent magnet pulleys

STEARNS MAGNETIC PRODUCTS has recently released a bulletin, #1022, giving useful data and specifications on the complete line of Indox V permanent magnet pulleys. An easy-to-use selection chart has also been included to make it simple to specify the correct pulley for any system.

***Enter 515 on Reader Card***

### Graders

HUBER-WARCO CO. has released a 16-page bulletin describing the construction of their new 8-D, 9-D, 10-D and 11-D graders and their features including constant mesh transmission. Large photographs, cut-away views and artwork are used throughout.

***Enter 516 on Reader Card***

### Convertible crane

A COLORFUL CATALOG published by Manitowoc Engineering Corp. tells all about the Manitowoc Model 3400—a 65-ton capacity crane, convertible to dragline, shovel, trench hoe and clamshell. Overhead clearance heights are reduced. A large diameter, wide roller path and extra strong king pin eliminate the need for hook rollers.

***Enter 517 on Reader Card***

### Motor reducer

A NEW 8-PAGE BULLETIN pertaining to motor reducers is now available from Sterling Electric Motors, Inc. Bulletin #198 describes and illustrates design features, basic types and many modifications as well as mounting positions in which these units may be used.

***Enter 518 on Reader Card***

**END**

*Are you getting maximum kiln production?*

*Are you getting optimum thermal efficiency?*

If your cement manufacturing operation is typical of the industry, you're caught in today's profit squeeze brought on by rising fuel and labor costs. You're interested in even small increases in kiln output or small reductions in fuel consumption. You may be considering conversion to a more economical fuel or replacement of two short kilns with one long one.

However you are approaching the problem, one of your prime concerns is a burner that is engineered for maximum production at optimum thermal efficiency . . . tailored to your specific operating conditions. And that's where we fit in.

Coen Company has had 35 years' experience in the application of firing equipment to rotary kilns. Each Coen burner is individually engineered to the exact job requirements. On new installations, this custom approach assures economical obtainment of high tonnage of quality product. On conversion installations, Coen burners have increased production rates as much as 25% while maintaining or increasing thermal efficiency in terms of BTU/bbl. of output.

We think we have the answers to these pressing profit questions. May we work with you on your application?

*If you are not sure of the answer to either of these questions . . .*

. . . you should have our new brochure, Bulletin KB-59. It describes the Coen "custom approach" in designing burners for gas, oil or combination firing of kilns at heat release rates varying from 3,000,000 to 250,000,000 BTU/hr. It also covers fuel oil pump and heater sets and some exclusive Coen developments such as the unique Multi-Tip nozzle for narrow spray angle mechanical atomizing. You'll find it a valuable addition to your reference files . . . send for your copy today.

*Combustion Engineers and Manufacturers*

SINCE 1912 COEN

**COEN COMPANY**

*40 Boardman Place • San Francisco 3*

FYR-COMPAK® GAS AND OIL BURNERS; FYR-MONITOR® FLAME SAFEGUARD SYSTEMS; FUEL OIL PUMPING, HEATING & STRAINING SETS; AIR HEATERS; KILN BURNERS

*Representatives in principal cities throughout the world*

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Every minute of busy and idle time is recorded on tamper-proof charts.

**Servis Recorder lets you know if equipment is busy or idle!**

**Can Save You Thousands**

This simple $40 instrument bolts to any shovel, grader, haul truck or other machine. It makes a record of when equipment is busy and when it is idle. Now you can know exactly how busy every piece of equipment has been kept every day of the week even when you're not around.

Six recorders saved one firm $40,000. Even one recorder could save you from making an unnecessary purchase of additional equipment. Send for illustrated folder today.

**The SERVICE RECORDER Co.**
1015A Rockwell Ave., Cleveland 14, Ohio

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**NEW**

**GILSON *Porta-Screen*™ PORTABLE TESTING SCREEN**

Motor or hand-driven . . . operates free-standing, bolted to semi-permanent location, or on bare ground . . . dismounts in 2 portable sections . . . handles samples up to 25 lbs., 1½-in. to 200-mesh.

**USE *Porta-Screen* FOR:**
- ★ field inspection and testing
- ★ ready-mix plants
- ★ blacktop plants
- ★ concrete products plants
- ★ small aggregates plants
- ★ lightweight aggregates
- ★ ores and minerals
- ★ mass separation for research
- ★ screening under direct wash water

Write for literature

*The new Gilson Porta-Screen*
*The standard Gilson Testing Screen*
*Gilson Sample Splitter and other accessories*

**GILSON SCREEN CO.**
MALINTA, OHIO

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# NEW PATENTS

by OLIVER S. NORTH

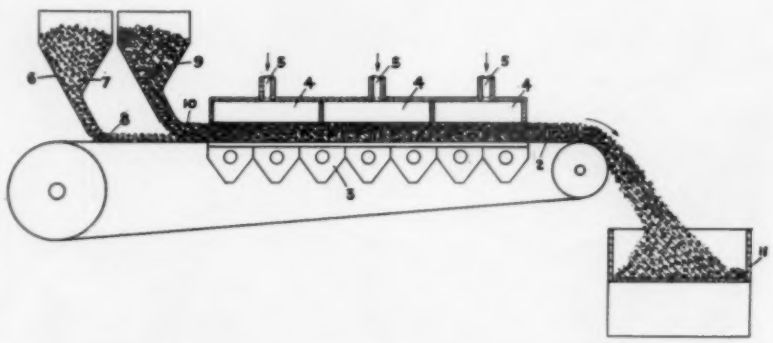



*Diagram data of Patent No. 2,923,539 shows, in schematic longitudinal section, the sintering system used in this process. A layer of a mixture (8) of finely ground limestone and coke or anthracite is fed onto the sintering band (2), and a considerably thicker layer (10) of coarser particles of limestone is laid over it. Suction is maintained in the windboxes (3). Gases are drawn through inlets (5) into hoods (4) and hence through the layers of limestone and fuel.*

**Lime**

U. S. 2,923,539—Process and arrangement of equipment for producing **lime** by down-draft sintering, of a layered charge of limestone and coke or anthracite. The product is uniformly burned and is less likely to be contaminated by fuel ash than when produced by earlier known down-draft sintering methods. (to K. Meyer; assigned to Dravo Corp.)

Canadian 592,292 — Fluidized bed process for calcining and hydrating raw **lime,** wherein the limestone is practically completely converted to calcium oxide and the lime will be uniformly hydrated to any degree desired without excessively wetting any portion thereof. (to B. E. Roetheli; assigned to Esso Research & Engineering Co.)

Canadian 592,992—Apparatus and method for manufacturing granules of definite grain size, e.g., granulated **lime** or raw **phosphate rock.** The powdered dry material is fed to the granulation surface and there sprayed with a granulation liquid. (to F. Rodis and A. Hinz; assigned to Knapsack-Griesheim A. G.)

British 824,949—Improved method and apparatus for producing a powdered **lime** by burning granulated limestone which has been preheated in a multi-stage heat exchanger utilizing waste gases. (to J. Rosa and V. Petr)

**Perlite**

British 822,714—Material for and method of insulating underground pipes. The pipe is placed on supports in a ditch, and the ditch then filled with a mixture of expanded **perlite** coated with solvent precipitated asphalt resin or like high-softening-point hydrocarbon, and a high-softening-point hydro-carbon in a dry state. (to A. C. Kidd)

U. S. 2,922,488—In a cannister-type filter assembly for removing vapors and impurities from air lines connected to pressure gages, the absorbent material used is loose expanded **perlite** in the ¼-inch to 325-mesh range, rather than mats of mineral wool or other inorganic fibers. (to C. T. Gruner; assigned to General Motors Corp.)

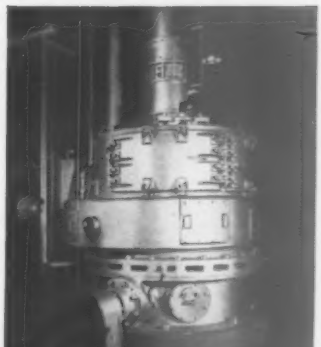
*(Continued on page 218)*

# B&W Pulverizer Fires 12 x 450 Ft. Kiln Efficiently, Dependably

## Unit Pulverizes from 204 to 216 Tons Daily of Coal Containing as much as 12% Moisture

A B&W EL Type Pulverizer enables the Cape Girardeau Plant of the Marquette Cement Manufacturing Company to direct-fire continually one of the largest kilns in the industry. They operate their pulverizer on a 24-hour day, 7-day-week basis and meet all production requirements. And — after well over two years of rugged grinding service this sturdy pulverizer has never caused an unscheduled plant shut-down.

Throughout the cement and rock products industry, performance records like that turned in at the Cape Girardeau Plant, have earned B&W Pulverizers a reputation for dependable, efficient, and economical grinding service. If you're thinking of building a new cement plant or perhaps modifying your existing facility, a B&W Pulverizer can help you cut operating costs and improve over-all plant efficiency. For the complete story, get in touch with your local B&W representative, or write The Babcock & Wilcox Company, Boiler Division, Barberton, Ohio.



B&W EL Type Pulverizer at Marquette Cement Manufacturing Company has ground an average of over 72,000 tons per year since its installation. No unscheduled shut-downs required for maintenance.

C-220

B&W

THE BABCOCK & WILCOX COMPANY

BOILER DIVISION

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## NEW PATENTS

(Continued from page 216)

### Barite

Canadian 591,599—In the flotation concentration of **barite,** the ore is treated with a mahogany petroleum sulfonate of prescribed characteristics, and then subjected to froth flotation to recover a barite product with a specific gravity of at least 4.2. This material may be roasted to eliminate the petroleum sulfonate residue. (to K. C. Vincent; assigned to National Lead Company)

Canadian 590,421—Use of ground **barite** in a bituminous mastic utilized for coating underwater steel pipelines. (to P. H. Timothy)

### Cement

U.S. 2,919,997—To counteract hydrogen sulfide generation and odor during mixing of **alumina cement** and water, sodium peroxide, hydrogen peroxide or sodium persulfate is added to the cement-water mix. (to H. A. R. Zehrlaut; assigned to Zeco Research Corporation.)

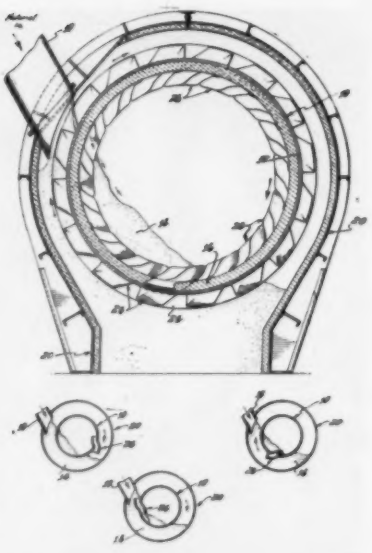

*Diagram data of Patent No. 2,923,-538 shows a cross sectional view of the rotary kiln at the point at which the raw mixture is fed into the kiln. Raw material (light stippling) is fed into a housing (20) surrounding the kiln shell (10). Scoops (26) pick up portions of the material and dump it into the kiln during rotation. The several scoops are so designed as to form a constriction of the kiln diameter, resulting in the formation of a quiescent zone at the points of discharge of raw material into the kiln.*

2,923,538—For use in the dry-process manufacture of **portland cement,** a kiln construction is provided for introducing into the kiln the finely divided raw mixture in a zone of relatively quiescent gas flow. Dust loss is greatly reduced. (to P. L. Schoonover; assigned to Monolith Portland Cement Company)

U. S. 2,921,779—Design for a rotary **portland cement** kiln specifically adapted to be used to produce a sinter containing soluble sodium aluminate from a mixture of alumina chemically combined with silica, lime and soda. Means is provided for holding the material in separate sections of the system at a relatively constant temperature, thus forming "soaking zones" where the material is heated in a series of essentially independent steps. (to G. M. Spence; assigned to Monolith Portland Midwest Co.)

Canadian 590,818—Vertical shaft kiln and related method for burning **lime, portland cement** raw mixtures, etc. The raw feed includes an optimum proportion of combustible solids to satisfy the heat requirement of the process. (to F. P. Somogyi)

(Continued on page 220)

for Economy-Efficiency!

*Get the Long-Lasting Forged, Heat treated*

**CAPE ANALLOY DROP BALL**

**FORGED** and **HEAT TREATED** from abrasive resisting **ALLOY STEEL.** Specifically designed for rugged service. Economical, dependable secondary breakage! **SONIC TESTED** before shipment.

**Furnished in sizes from 2000 to 12000 lbs.**

**CAPE ANN ANCHOR & FORGE CO.**
**P. O. BOX 361**
**GLOUCESTER, MASS.**

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WITH A

# Bucyrus-Erie 40-R Rotary Drill

## You measure your advantage by the foot . . . .

When a Bucyrus-Erie 40-R moves in on a job, the owner can measure his advantage in feet — extra feet of hole drilled per hour, per shift or per dollar invested. Variable drilling speed and down pressure enable the 40-R to produce maximum footage with a minimum strain regardless of drilling conditions. For example:

**In Granite-Hard Formations** operator can exert maximum down pressure on the bit while the drill pipe turns slowly.

**In Soft Formations** operator increases rotating speed, eases down pressure and keeps air velocity high so that the bit will not become buried or choked in cuttings.

**In Varied or Fissured Formations** the 40-R is instantly adapted to each new set of conditions without stopping the operation. This is drilling efficiency that pays off in many extra feet per hour and in many extra years of service.

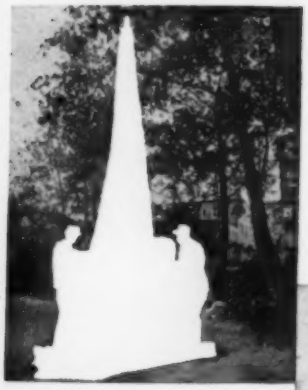
Write to Bucyrus-Erie Co., South Milwaukee, Wis., for illustrated bulletins on the 40-R (diesel or electric for drilling 6¾ to 9-in. holes), the 50-R (full electric for drilling 9⅞ to 12¼-in. holes), or the 30-RC (for holes to 7⅞-in.).

4B60

BUCYRUS ERIE®

most respected name in the field

# IS THERE A VOID IN YOUR DRILLING PROGRAM



?

FILL IN THIS VOID

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Many progressive and successful firms throughout the United States and in foreign countries want and use no other core drilling equipment except Sprague & Henwood's. They have found it to be rugged . . . easy to use . . . versatile. Are you having trouble? You might just have the wrong equipment. Why not write to Sprague & Henwood today and describe your present drilling conditions, or the drilling conditions you expect to encounter. Sprague & Henwood will supply you with equipment and complete drilling information, enabling you to go far toward filling the void in your drilling program.

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Export Division: Sprague & Henwood International Corporation, 11 W. 42nd St., New York, N.Y.

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## NEW PATENTS

*(Continued from page 218)*

Canadian 586,028—A preheater for **portland cement** raw mixtures, e.g. filtercake or nodules, comprises a rotatable two-part chamber, with the parts offset from one another so as to effect a uniform and continuous discharge over the entire area of the hearth. (to G. G. J. Davis; assigned to The Associated Portland Cement Manufacturers Ltd.)

British 821,687—Apparatus and process for simultaneously conveying hot **lime** or **portland cement** clinker in bulk and subjecting the material to the action of air or other gas to bring about heat exchange, thereby cooling the hot material. (to N. E. Andersen; assigned to F. L. Smidth & Co. A.S.)

British 823,828—In an improved method for filtering **portland cement** raw slurries, the slurry is centrifuged towards a vertical screening wall, through which the undesired fine particles pass while the recovered material is discharged by gravity towards the kiln. (assigned to Ciments d'Obourg Soc. Anonyme)

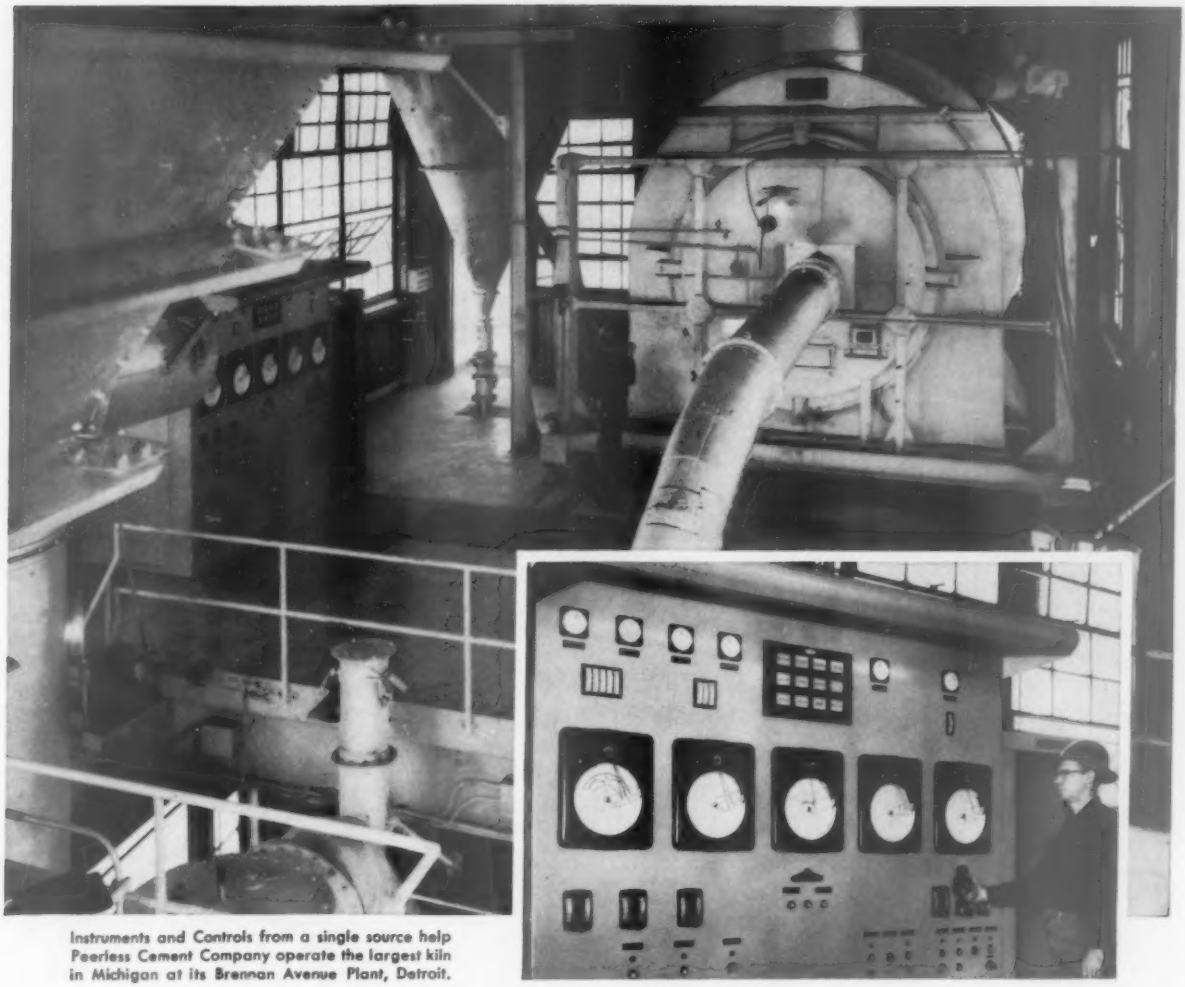
British 824,219—In the production of raw mixtures for the making of **portland cement,** precipitated chalk obtained as a byproduct from the manufacture of ammonium sulfate is used as the source of calcium carbonate. The chalk and clay or other materials are mixed thoroughly in a limited amount of water under the action of kneading and shearing forces to form a uniform plastic mud. Filtering is eliminated. (to W. J. Skinner; assigned to Imperial Chemical Industries Ltd.)

U. S. 2,924,847—Method and apparatus for nodulizing finely divided materials, particularly a **portland cement** raw mixture, wherein the nodules so formed are of uniform size, shape and structure, and are strong enough to be calcined in a rotary kiln. (to P. Keiding and K. J. Sylvest; assigned to F. L. Smidth & Co.)

U. S. 2,925,755—Device for lessening the noise caused by the explosion of a kiln gun used for shooting out clinker rings in **portland cement** kilns. (to A. C. Krus; assigned to Olin Mathieson Chemical Corp.)

British 820,732—Design for a multiple-chamber shaft preheater for **portland cement** raw mixtures. Kiln gases are admitted through valve-adjusted openings in a bottom plate. (to W. Berz)

*(Continued on page 222)*



Instruments and Controls from a single source help Peerless Cement Company operate the largest kiln in Michigan at its Brennan Avenue Plant, Detroit.

# This giant kiln gives peak performance <u>longer</u> with Bailey Controls

The Peerless Cement Company of Detroit demands maximum capacity, uniform production and low fuel rate from its largest kiln . . . and Peerless gets it!

They do it with a Bailey Control System that gives them complete control of combustion, clinker cooler, and other kiln variables.

The system keeps continuous chart records of 11 important variables, including temperatures, drafts, air flow, kiln speed, fan speed, % oxygen, and % combustibles.

All this is done so dependably that the kiln often makes week-long runs without being touched.

All recording receivers in the Bailey System are plug-in components—easily removed, regrouped, or replaced to meet changing requirements. Additional records are added simply by plugging in receivers on existing recorder cases. Your Bailey Engineer can help you plan for peak performance — call him or write for your Bailey Kiln Control Folder.

C115-1

## BAILEY METER COMPANY

**1039 IVANHOE ROAD • CLEVELAND 10, OHIO**

**In Canada—Bailey Meter Company Limited, Montreal**

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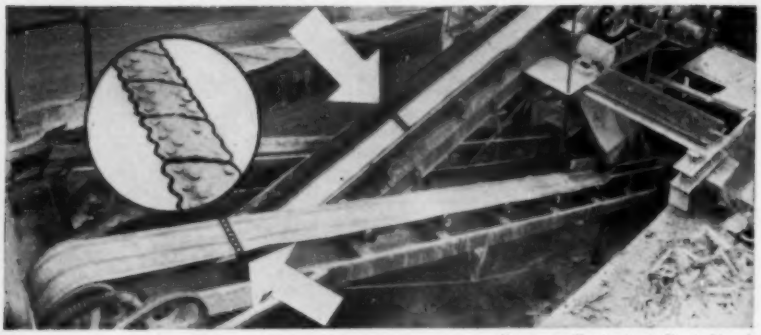
# *"We tried them all— then standardized on* CRESCENTS"



Camarco Contractors Plant No. 1

"Our conveyor belts take a terrific beating and only a rugged fastener will hold them. We found that CRESCENT plates did a superior job, and because of the speed with which they can be attached with CRESCENT self-clinching rivets . . .

*WE CUT OUR DOWN TIME IN HALF!"*

NO HOLES TO BORE • NO TOOLS NECESSARY • A HAMMER IS ALL YOU NEED!

**CRESCENT BELT FASTENER CO.**

381 Fourth Ave., New York, N. Y.

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Distributors throughout the World

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HERE WE GO!
WAGON TRAIN
MORE TONS PER TRIP
A CONVENIENT WAY TO UNLOAD — SIDE DELIVERY — KEEP GOING. LEAVE ROAD CLEAR FOR NEXT WAGON TRAIN

**DIFFERENTIAL COMPANY**

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*Railway Air Dump Cars*
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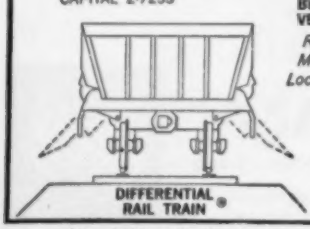


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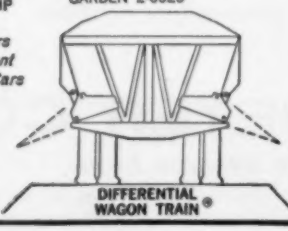


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## NEW PATENTS

*(Continued from page 220)*

### Clays

U. S. 2,925,393—In the manufacture of cracking catalyst pellets, **kaolin** is mixed with sulfuric acid, pelletized, aged in white mineral oil containing a minor quantity of di-tertiary butyl-para cresol, heated and calcined. (to W. W. Gary; assigned to Minerals & Chemicals Corp. of America)

U. S. 2,927,882 — An insecticide composition consists of parathion or malathion treated with a glycol and absorbed onto **kaolin, attapulgite, diatomite** or exfoliated **vermiculite.** (to L. Trademan, M. A. Malina and L. P. Wilks; assigned to Velsicol Chemical Corporation)

Canadian 589,819—In the making of a modified clay product suitable for use in resins, plastics, rubbers and other organic systems, **bentonite** or **hectorite** is reacted with an onium compound and then further reacted with an organic compound whose radical has an affinity for the organic portion of the onium radical. (to J. W. Jordan, D. S. Bolley, L. W. Carter and D. H. Larsen; assigned to National Lead Co.)

### Aggregates

U.S. 2,919,804—Design for a skip or bucket having a classifying grid therein and especially adapted to receiving dump loads of unclassified **sand and gravel,** and in one motion elevating and classifying the material, and feeding the coarse fraction to a crusher inlet and the fine fraction to a bypass inlet. (F. P. Robbins)

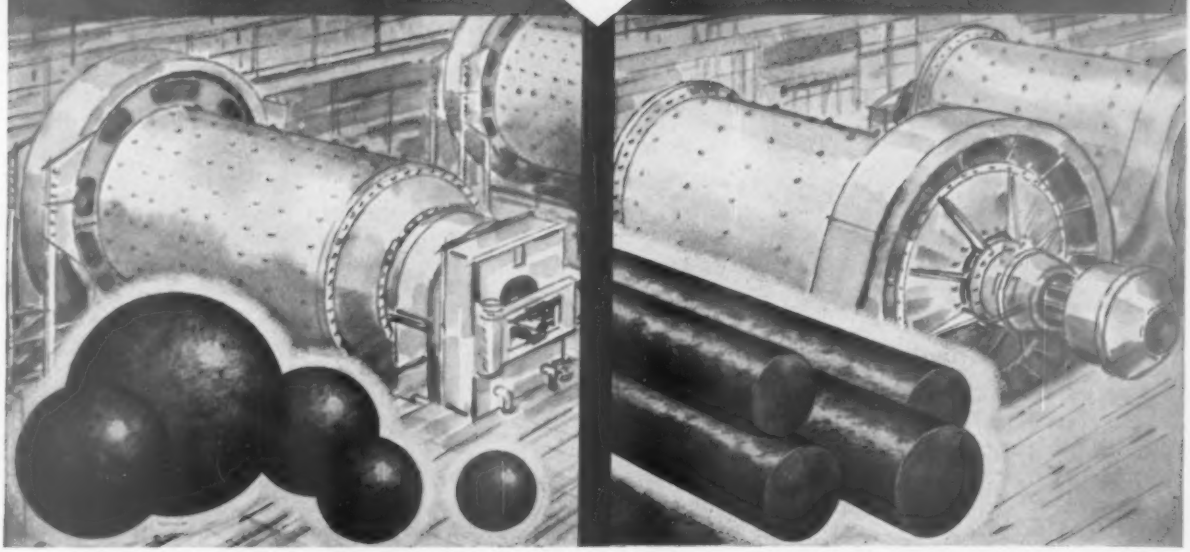
U.S. 2,919,808—Design for a **sand and gravel** washer in which the duration of the washing process can be regulated in accordance with the nature and properties of the raw material being processed. (to L.G. Hilkemeier; assigned to Worthington Corp.)

### Lime

U. S. 2,904,401—Improved continuous process and apparatus for rapidly hydrating **lime** of varying quality and physical characteristics to produce a highly uniform product. A thick paste is treated instead of the usual dilute slurry. In this process it is not necessary to use preheated water. (to G. M. Booth; assigned to Wallace & Tiernan Inc.)

**END**

# *Total grinding costs are lower with CF&I grinding balls and rods*



Grinding Balls and Rods have a direct bearing on major grinding costs — mill throughput and power consumption. The use of CF&I Grinding Balls and Rods will actually increase your mill throughput, lowering your power consumption per ton of mill ground. This is a result of the microstructure of the high quality steel made and used by CF&I.

CF&I Grinding Balls have the balance of hardness and toughness that provides proper wear and impact resistance. In addition, their excellent abrasion resistance permits them to wear evenly and retain their original shape.

CF&I Grinding Rods — through controlled mill chemistry techniques — have excellent wearing properties, resisting bending and premature breakage.

All these factors contribute to more efficient grinding, higher throughput... lower grinding costs. For the complete story on the advantages of CF&I Grinding Balls and Rods, contact your local CF&I sales office.

**Other CF&I Steel Products for The Cement Industry**

CF&I Industrial Screens • CF&I-Wickwire Rope • CF&I Grader Blades

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CF&I STEEL

## MINING PRODUCTS

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*In the West:* **THE COLORADO FUEL AND IRON CORPORATION** — Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Ft. Worth • Houston Kansas City • Lincoln • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Leandro • Seattle • Spokane • Wichita
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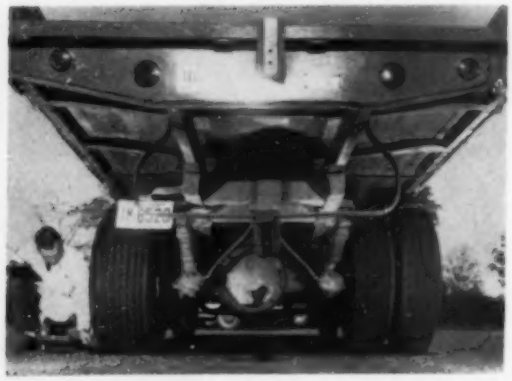
# NEW MACHINERY

FOR FREE INFORMATION on these items, simply fill out and mail postage-paid Reader Service Card found elsewhere in this issue



### Fresh approach to dual-tire problems

A single wide-tread experimental tire has been developed to replace the two conventional tires on dual truck wheels. This unusual tire is nearly twice as wide as a conventional tire and has more than twice the load-carrying capacity of the two tires it replaces.

The new tire reduces the problem of uneven wear due to changing load distribution of a pair of tires. The problem of damage from rock wedged between dual tires is completely eliminated.

For truck owners plagued by inventory and maintenance problems the new tire will offer outstanding savings. Tire inventory can be cut in half. The inventory of extra rims, spacers and bolts can be drastically reduced. Simple weight reduction with the new tires on a tandem tractor and trailer could approach 1,000 lb.

So new that it has not yet been named, the new tire has been built only in 18-19.5 size to replace the conventional 11-22.5 dual assembly. It will be available in both tubeless and tubed construction when results of the maker's fleet testing program have been evaluated. (The Firestone Tire and Rubber Co., Akron 17, Ohio)

*Enter 100 on Reader Card*

### Bin level indicators

This manufacturer's line of material level indicators has been extended to include units for hazardous dust locations. Design of the new units is identical to the general purpose units except for metal-to-metal grounding of the cover and body and a paddle shaft bushing machined to Underwriter's Laboratory specifications.

All models are operated with a shaded-pole induction motor mounted in a casing on the shell of a bin, chute or hopper driving a paddle shaft projecting into the material. When material restrains the paddle, the motor revolves around the shaft, actuating a pair of switches. When material falls away from the paddle, an adjustable tension spring releases the switches to let the motor drive the shaft and turn the paddle.

The units can be used to indicate the level of fine materials up to 1 in. and to control various operations. (Fuller Co., Catasauqua, Pa.)

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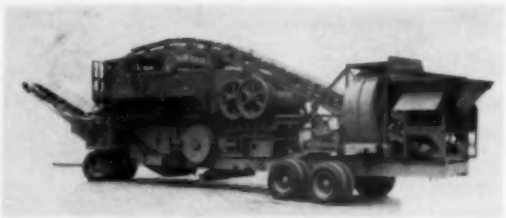
### Portable "Giant"



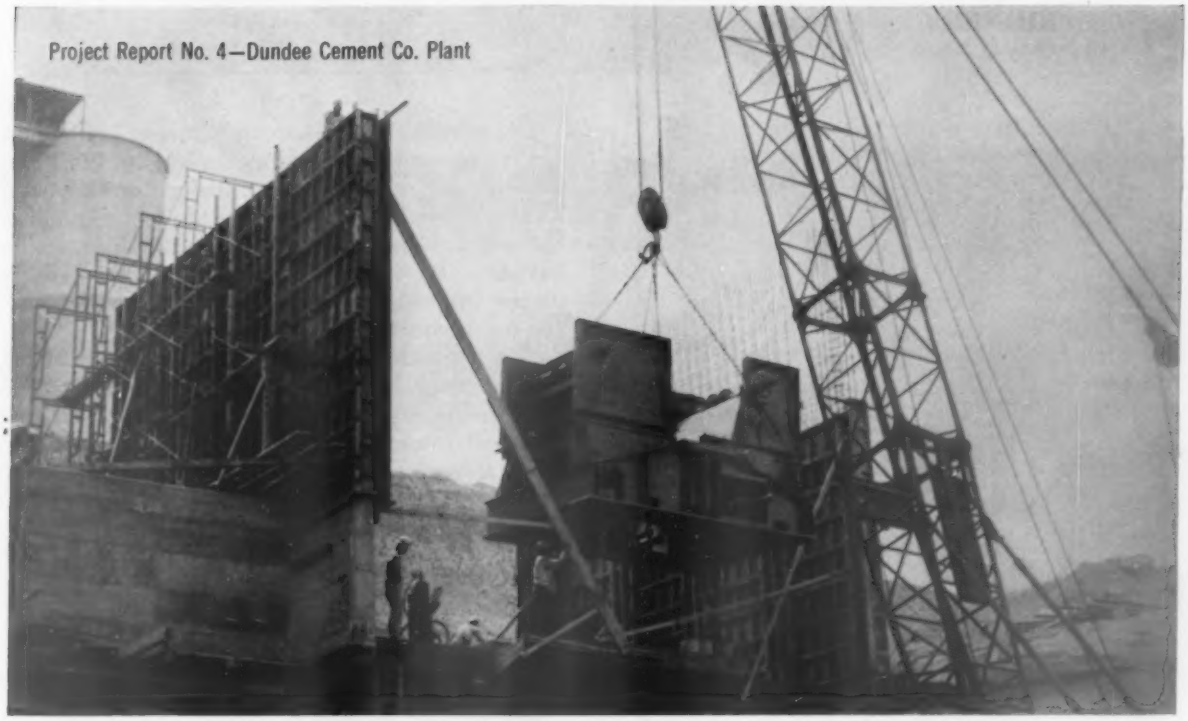
A new portable crushing and screening unit has teamed a high-capacity vibrating screen with a pair of high-efficiency crushers to offer a 400 tph. unit. This machine will make four products, including chips and sand.

Known as the "Giant," it uses the maker's new 13 x 36-in. synchronized, matched-jaw primary crusher with a 30 x 26-in. roll crusher as a secondary unit. To handle the production of these two crushers a 4 x 14-ft. triple-deck horizontal vibrating screen has been incorporated in the circuit. The whole assembly is completely portable and will meet the load limit requirements of most states. (Universal Engineering Corp., 625 C Ave. N.W., Cedar Rapids, Iowa)

*Enter 102 on Reader Card*

*Please turn to page 226*

Project Report No. 4—Dundee Cement Co. Plant



Installing impactor-type hammermill which has capacity of 400 tons per hour.

# DUNDEE PLANT FEATURES CEMENT INDUSTRY'S FIRST CONTINUOUS CLAY PREPARATION

This 42" gyratory crusher reduces blasted limestone from the quarry to 5½" top size crushed rock at the rate of 700 tons per hour.

This Eagle Iron Co. log washer, weighing 158,000 pounds, has four logs, each 52 inches in diameter and 35 feet long.

Many cost-saving, labor-saving new features are characteristic of the modern Dundee Cement Company Plant now producing in excess of rated capacity.

One unique feature is a continuous clay preparation process. This new method will save considerable time and money by eliminating the intermittent cleaning of equipment required in the conventional batching process.

All machinery used for clay preparation is housed in the primary crusher plant. The compact nature of equipment arrangement made it necessary to install machinery in successive stages as the plant was erected. The awarding of the building construction, as well as the machinery installation, to Darin & Armstrong provided for closer coordination and achieved earlier than scheduled completion at minimum cost.

(for Project Report #3 see March issue)

**DARIN & ARMSTRONG, INC.**

GENERAL CONTRACTORS

Chicago 38, Ill. DETROIT 38, MICH. Cincinnati 18, Ohio

*Enter 1136 on Reader Card*

*continued from page 224*

### Portable testing screen

A highly portable test unit offers aggregate producers an opportunity to save time and manpower. By moving this testing equipment right to the screen, crusher or stockpile where a sizing problem exists, prompt accurate testing can be done. This overcomes the disadvantages of hand screening and the inconvenience of interrupting the schedule of the permanent testing screen in a distant lab.

The new Porta-Screen handles samples of crushed stone, sand and gravel or lightweight aggregates up to 25 lb. It can take out six sizes ranging from 1½ in. down to 200 mesh using individual wire cloth squares imbedded in resilient plastic edging. In this way the wires are held in place to prevent oversize working through the mesh. The cloth sections are readily interchanged to give a wide range of test screens.

The new test unit dismantles into two convenient sections for easy portability. It is hand driven, but where power is available, it can be motor driven. The whole assembly may be operated free standing on any surface or may be bolted to any convenient support. (Gilson Screen Co., 110 Center St., Malinta, Ohio)

***Enter 103 on Reader Card***

### Economy pulverizer

An all-purpose hammermill offers top tonnage production with low investment and low operating expense. As a production unit, it is ideal for pulverizing and crushing lime, gypsum, shell and chalk as well as limestone for aggregates and agricultural limestone.

The new Model 20 Hammer Crusher has many quality features including steel plate construction and abrasion-resistant liners. Reversible hammers and breaker plates assure long life and minimum maintenance, according to the manufacturer. Quite naturally, the capacity of the machine will depend on the hardness of the material to be crushed and the total reduction needed.

Other features of the new unit include anti-friction bearings, a tramp iron pocket, a heavy flywheel and three free-swinging hammers on the balanced rotor. A simple wedge adjustment assures a steady flow of crushed material and even wear of the breaker plate sections. (Iowa Mfg. Co., Cedar Rapids, Iowa)

***Enter 104 on Reader Card***

### Bag conveyor belt

A newly developed rubber belt with wear-resistant ridges offers new conveying efficiency for handling bags, sacks and other packages. The Dur-A-Lift belt can operate efficiently on inclines (or declines) of 45 deg. and for some packages up to 50 deg.

The deep, V-shaped ridges are self-cleaning and assure maximum grip at all times. The new belt is available in 48-in. stock width in either 3-ply or 4-ply, 28-oz. duck carcass. Other specifications and widths to meet specific requirements can be manufactured on special order. (Boston Woven Hose & Rubber Co., Box 1071, Boston 3, Mass.)

***Enter 105 on Reader Card***

### Portable conveyors

A complete line of heavy-duty portable conveyors is offered to aggregates producers. In addition, vibrating screens and feeders are available to make a complete, portable processing package.

The new units are obtainable in 18, 24 and 30-in.

*Please turn to page 228*

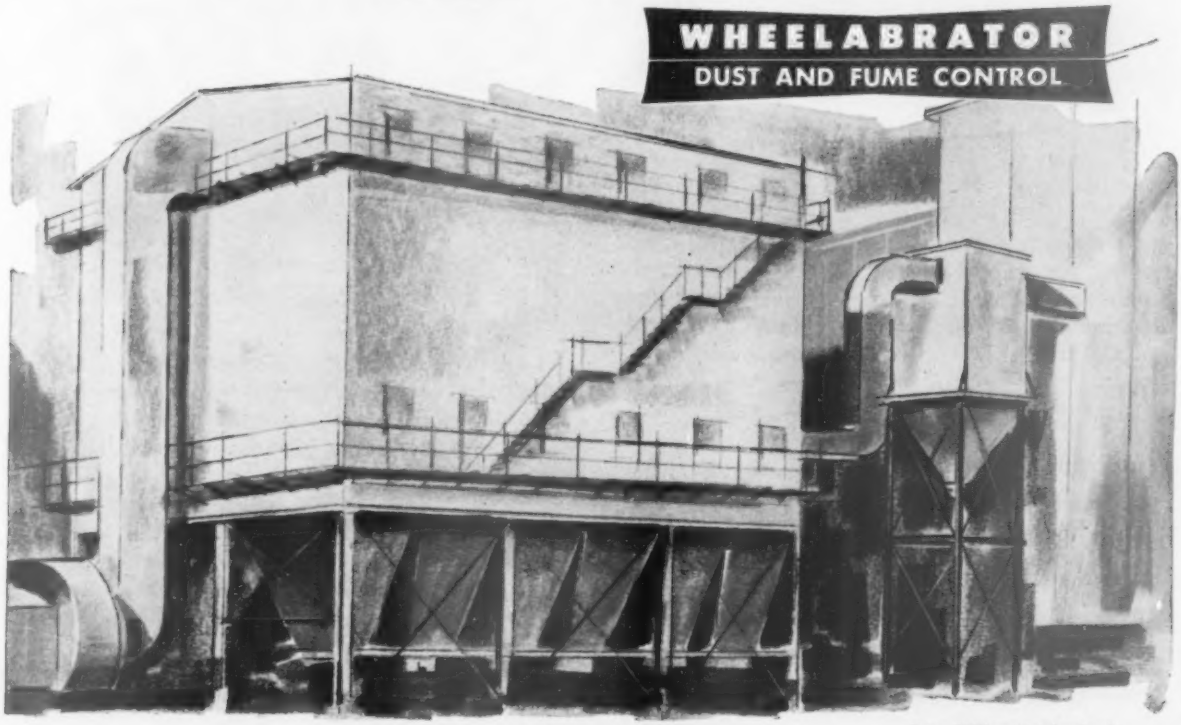
*Before you buy a glass baghouse* **see**

# what wheelabrator® can do for you

Look at Wheelabrator's record of performance and successful installations collecting hot gases in glass baghouses. Since the first Wheelabrator Dustube® installation utilizing Glastube® filter tubes, made over 7 years ago, Wheelabrator has amassed an unequaled wealth of experience and know-how in designing custom-made baghouses using glass fiber tubes. Today, more than 4 million c.f.m. of hot gases are being filtered in Wheelabrator Glastube baghouses, using either the repressuring or shaking methods of bag cleaning. Wheelabrator Dustube Collectors embody many exclusive features that insure highest efficiency at lowest operating and maintenance costs. Collection efficiencies above 99% are regularly achieved. Input temperatures up to 550°F are accommodated in closed baghouses, and up to 650°F in open baghouses, without costly pre-cooling equipment.

Wheelabrator Dustube collectors offer the most practical solution to your problem of filtering hot gases from dryers, kilns or clinker coolers . . . the most favorable balance of equipment and operating cost to collection efficiency. For engineering consultation, write to **WHEELABRATOR CORP., 1281 S. Byrkit St., Mishawaka, Indiana. In Canada, P.O. Box 490, Scarborough, Ontario.**

***Write for this illustrated report of Dustube Collectors serving in many normal and high temperature applications.***

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widths, and in conveyor lengths of 30, 40, 50 and 60-ft. centers. These sizes are stocked, but intermediate belt widths and lengths will be available on short notice. Standard equipment includes a 30-in. deep reinforced truss, hydraulic lift to give a maximum discharge height of 22½ ft., truck axles and a choice of diesel, electric or gasoline power. (Bonded Scale and Machine Co., 132 Bellevue, Columbus 7, Ohio)

***Enter 106 on Reader Card***

### Bulk material hauler

Fine granular materials can now be hauled in relatively small lots with a newly developed bulk material hauler. The Model "C" unit is particularly useful for distributing or windrowing material at the job site—lime or portland cement for soil stabilization, phosphates or agricultural limestone for soil conditioning.

Four sizes are available ranging from 200 to 300 cu. ft. capacity, in body lengths from 8 to 15-ft. long. Material is discharged with a belt conveyor, and loads can be discharged in 6 to 12 min. Large openings in the top assure quick loading, and the hatches can be secured to prevent dust or moisture contamination of the load. (Highway Equipment Co., 616 D Ave. N.W., Cedar Rapids, Iowa)

***Enter 107 on Reader Card***

### Transistorized television system

A totally transistorized, lightweight television system has been built to withstand weather, shock, noise, dust and the extremes of environment typical in the rock products industry. Claimed to be the world's most rugged television camera, the new unit was developed originally to meet unusual conditions in missile and aircraft applications.

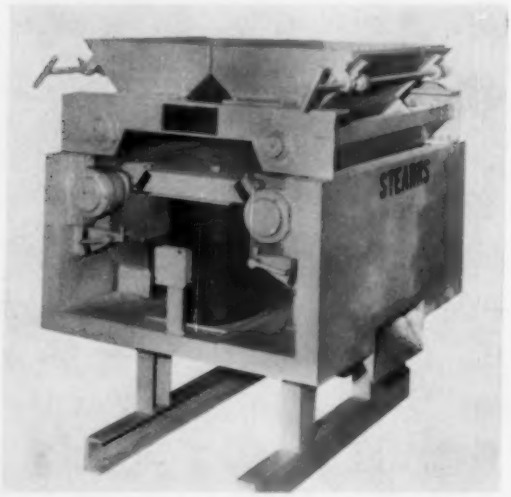
The Model RGS-10 television package consists of a camera and camera control capable of operating up to 2,000 ft. apart. The camera itself weighs only 15 lb., is 16 in. long and about 7 in. diam. It operates under severe conditions without an auxiliary protective housing. Power requirement is 15 w. with 115 v. ac. and with 50 or 60 cy. current.

Light weight and ability to perform under severe operating conditions is attributed to the use of transistors and plug-in transistorized printed circuits. This eliminates "microphonics" and erratic operation often caused by noise and vibration. Automatic light level compensation adjusts the camera circuits for changes over a 2,000:1 range.

A complete group of optional equipment is available including zoom lens, optical focus, lens turret and pan and tilt devices. (Dage Television Div., Thompson Ramo Wooldridge Inc., Michigan City, Indiana)

***Enter 108 on Reader Card***

### Magnetic separator




A new line of magnetic separators has been designed especially to remove tramp magnetic particles from fines in the 10 to 200-mesh range. The new units are said to give exceptionally high field intensity at relatively low cost. Their performance apparently is equal to multi-roll separators for many applications.

The new Type KT separators are available in 10, 20 and 30-in. widths in either single or twin-coil styles. (Stearns Magnetic Products, 635 So. 28th St., Milwaukee 46, Wis.)

***Enter 109 on Reader Card***

*Please turn to page 230*

**AUTOMATION WITHIN THE CEMENT INDUSTRY** is being assisted by Dage closed-circuit television. At the Oro Grand, California, plant of Riverside Cement Company, Dage TV cameras provide a constant check on rotary kilns. Observers in the process control room are able to control kiln feed and clinker formation by watching two television monitors. The results . . . better quality cement at lower cost.

The ideal closed-circuit installation for rugged industrial use is Dage TV's new RGS-10 system. Consisting of a 700 line resolution camera and camera control, this system is highly applicable for usage in mines, oil refineries, aggregate plants and in other areas of environmental extremes. The RGS-10 camera requires no additional housing; weighs only 15 pounds; has automatic light level compensator; is transistorized with exception of vidicon tube. The camera control will operate 2000 feet from the camera; is completely transistorized; features plug-in modules for easy servicing. The entire system is engineered to rugged military and commercial requirements.

Dage manufactures a complete line of closed-circuit television equipment for industry, the military, research and development, education. Write for literature or request consultation about your application for closed-circuit TV. No obligation of course.

## Better Cement at Lower Cost with DAGE INDUSTRIAL TV

Dage RGS-10 ruggedized TV Camera

Riverside Cement's process control center utilizes 2 Thompson Ramo Wooldridge systems . . . the RW 300 computer and Dage closed-circuit TV.

DAGE **Thompson Ramo Wooldridge Inc.**

**DAGE TELEVISION DIVISION**

**3305 W. 10th St., Michigan City, Indiana**

**Export Representative** — Rocke International Corporation
13 E. 40th St., New York 16, New York

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IMPROVED
PERFORMANCE
•
SPRAYING SYSTEMS
SPRAY
NOZZLES
• Choose from the industry's most complete selection of capacities and types to obtain the nozzles that best fit your job. Improve spraying efficiency and lower your spraying costs. Wide choice of nozzles for washing, dust control operations and concrete curing.
Write for Catalog 24
WRITE FOR Catalog 24... forty-eight pages with complete data on nozzle types, capacities and performance.
SPRAYING SYSTEMS CO.
3285 RANDOLPH ST., BELLWOOD, ILL.

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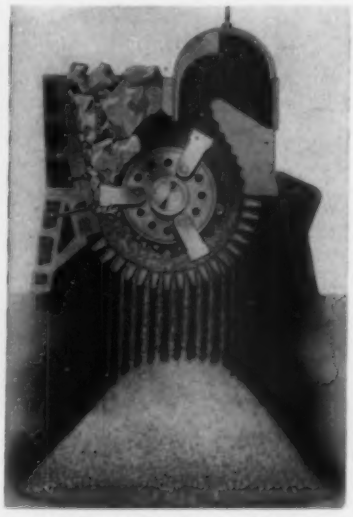
Since 1885—(Pioneers) Manufacturers of Impact Hammermill Reduction

**UNIFORMITY IN CRUSHING**

Whether coarse or fines for better compaction, so highly desired by Highway Engineers

The IMPACT HAMMER CRUSHER meets practically any specification of road rock, commercial aggregate or agricultural lime stone, with high tonnage production in ONE OPERATION and with low power requirements. Available in a wide range of sizes.



Cut-a-way view of a GRUENDLER IMPACT HAMMER CRUSHER with grate bars spaced for a rapid discharge of a uniform fine aggregate or agriculture limestone. NOTE the large roller-bearing hammer rotor, the heavy duty construction of breaker plates, grate bars and protective tramp iron trap.

WRITE FOR ILLUSTRATED BULLETIN #800-A

Manufacturers of Portable and Stationary Rock and Gravel Crushing, Screening, Washing and Material Handling Equipment.

**GRUENDLER CRUSHER & PULVERIZER CO.**

Dept. RP-560 2915 N. Market St. St. Louis 6, Mo.

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## NEW MACHINERY

*continued from page 228*

### Big diesel engines

Two new 8-cylinder V-type diesel engines rated at 350 hp. and 430 hp. have been offered for the heavy service in the rock products industry. These engines have been designed from the ground up to provide economic and reliable power for severe applications.

The smaller unit is naturally aspirated while the larger is turbo-charged. This engine was designed from the beginning to be turbo-charged, and the maker states that it represents the most advanced engine in its class for ruggedness, relatively small size, low weight for its power and low cost. The 350 hp. engine weighs 2,940 lb.—8.4 lb. per hp.—while the 430 hp. engine weighs 2,970 lb., or about 7.4 lb. per hp.

In spite of their newness, the two engines have been extensively field-tested in a wide range of heavy duty applications including haulage trucks at the Glen Canyon Dam in northern Arizona. (Cummins Engine Co., Columbus, Ind.)

**Enter 110 on Reader Card**

### Mobile crane

A redesigned, newly-improved rubber-tired mobile crane offers a number of features. The Model 357 is a self-propelled unit rated at 15 tons capacity but is quickly and easily converted to a $\frac{5}{8}$-cu. yd. dragline or clamshell crane.

Redesign of the upper works resulted in a rig with lower maintenance, reduced operating expense and less downtime. Costly dismantling of the hoisting mechanism is no longer necessary with split-drum construction.

High-speed road travel is achieved with a two-speed, air-operated transmission while clearances meet most highway requirements. A short turn radius adds to the unit's mobility and flexibility. (Unit Crane & Shovel Corp., Milwaukee, Wis.)

**Enter 111 on Reader Card**

### Materials handling pumps

A broad line of open-impeller, single-stage suction pumps is offered to handle abrasive or non-abrasive suspensions and thick slurries at capacities up to 9,500 gpm. and up to 220-ft. head.

All pumps in the line have 45 deg. self-venting discharge connections. The non-clogging impellers have back ejector vanes, external adjustment of clearances, renewable side plates and split glands. These features make maintenance and adjustment easy, according to the maker. (Goulds Pumps, Inc., Seneca Falls, N.Y.)

**Enter 112 on Reader Card**

*Please turn to page 232*

# TYLER can help you screen new ideas

When you have a new application involving woven wire screen for processing materials, here's how to get the right answers: Turn to W. S. Tyler, the leading producer of woven wire screens for industry.

Usually, Tyler can give you the answer based on actual operating experience. But when new ideas and new problems are presented, our Customer Service Laboratory will dig in and come up with the solution. Samples of your raw material can be shipped to this Laboratory and tested on a variety of equipment, to pre-determine capacity and performance in plant operation. This enables us to positively recommend the proper screen for your requirements . . . by selection from over 53,000 existing specifications, or by development of a new one.

Specify Tyler woven wire screens for your processing and be sure it's right for the job.

**TYLER**

**WOVEN WIRE SCREENS • SCREENING MACHINERY**
**TESTING SIEVE EQUIPMENT**

**The W. S. TYLER Company** • *Cleveland 14, Ohio*

**OFFICES:** New York • Chicago • Boston • Philadelphia • Atlanta • Dallas • Los Angeles San Francisco • Baltimore • Birmingham • Houston • Minneapolis • Pittsburgh • Salt Lake City • The W. S. Tyler Company of Canada, Ltd., St. Catharines, Ontario • OFFICE: Montreal

*Enter 1137 on Reader Card*

## NEW MACHINERY

*continued from page 230*

### Blasting pellets

Ammonium nitrate granules are now available in free-flowing, highly porous pellets which the manufacturer claims will increase the economy and effectiveness of blasting. The new pellets are made in a new plant designed especially to manufacture an ammonium nitrate particle of optimum size, shape and density.

The free-flowing pellets are offered in 50 or 80-lb. moisture-resistant bags. They will be available in premixed form. But they can be field mixed easily, and the porous pellets readily adsorb fuel oil or other sensitizing agents. (Atlas Powder Co., Wilmington 99, Del.)

*Enter 113 on Reader Card*

### Motorized vibrating feeders

This manufacturer has added new sizes and types to its already extensive line of motorized counterweight vibrating feeders. The complete line permits feeding rates from a 5 tph. dribble of fine material to a 1,700 tph. torrent of heavy rock.

This large capacity is achieved with a group of twin-motor feeders ranging upward from about 275 tph. These units are offered floor-mounted or cable-suspended; in lengths from six to 14 ft.; in widths from one to six ft., and with special features including grizzly decks and special hoppers.

Additional single-motor units round out the line in the lower capacity range. These find most economic application for feeding smaller tonnages of relatively fine materials out of surge bins, hoppers or other containers. (Link-Belt Co., Prudential Plaza, Chicago 1, Ill.)

*Enter 114 on Reader Card*

### Natural gas engines

Turbocharging and after-cooling has been added to this maker's line of natural gas engines. As a result, the ratings of the spark-ignited engines have been raised nearly 20 percent on some models.

But the fuel efficiency of all models has been increased to reduce fuel consumption on what are claimed to be the lowest cost power packages.

These new features are the latest in a line of continuing new developments arising out of field experience and research into the design of natural gas engines. (Caterpillar Tractor Co., Peoria, Ill.)

*Enter 115 on Reader Card*

*Please turn to page 234*


COLD CURE FOR HOT PROBLEM

When conveyor belts are damaged, get them back into operation the fast, convenient and economical way with PANG—the cold, self-vulcanizing rubber that eliminates the dangers of ply separation, blistering, and aging that are usually caused by heat.

• BUFF DAMAGED AREA. Repair on location. No need to dismantle conveyor.

• APPLY VULCANIZING SOLUTION. Your own maintenance crew can save belts easily with PANG process.

• MIX SELF-VULCANIZING COMPOUND. PANG rubber can be used on any size area, more than one area at a time, and along edges—any length.

• SPREAD OVER DAMAGE. PANG cures itself into a tough, resilient rubber and vulcanizes permanently onto rubber or fabric.

PANG® WRITE FOR CATALOG AND PRICE LIST • AUTOMATIC VULCANIZERS CORP. • 16 HUDSON ST., NEW YORK 13, N. Y.

*Enter 1069 on Reader Card*

CONTRACT CORE DRILLING

EXPLORATION FOR MINERAL DEPOSITS
INCLUDING URANIUM & LIMESTONE — ANYWHERE

FOUNDATION TEST BORING

GROUT HOLE DRILLING

Skilled crews and complete stock of core drills and accessory equipment maintained at all times

*Core Drill Contractors for more than 60 years*

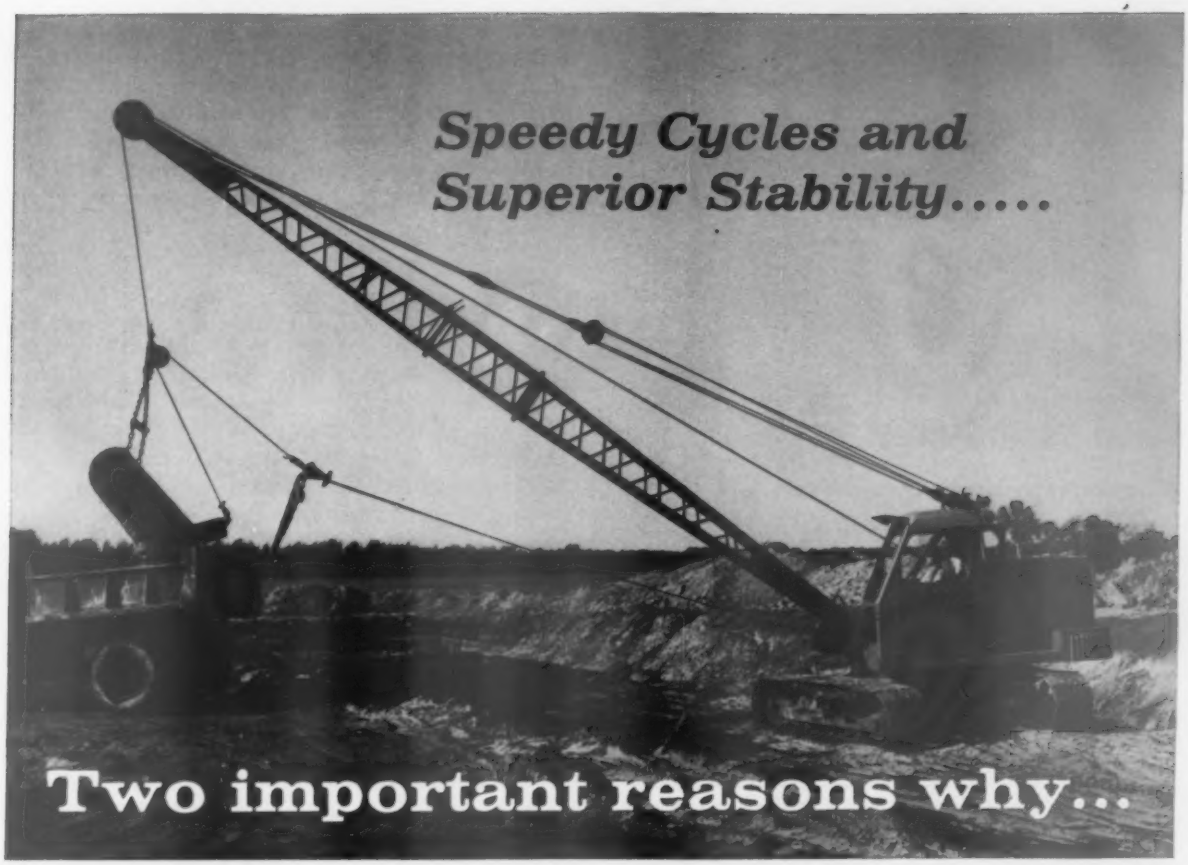
JOY MANUFACTURING CO.
Contract Core Drill Division
MICHIGAN CITY, INDIANA

*Enter 1068 on Reader Card*

WHAT ARE YOU PAYING FOR REPAIRS?

The money you are paying to keep worn-out equipment working may be just enough for you to own better equipment.

*See the* "WHERE TO BUY" *Section*




# UNIT gives you more Earning Power on dragline jobs

You'll find two essentials of profitable dragline service combined in a UNIT — speedy operating cycles, through full use of power, and outstanding stability. You save power and gain speed with UNIT direct-in-line drive from engine to main machinery. Power is transmitted through a worm drive with minimum loss due to friction. This is one of many UNIT built-in values that pay off in greater job output.

UNIT extra long crawlers and wider axles and shoes provide perfect balance, too. Stability is superior . . . you can work faster without continuous tipping on long or low boom work.

A UNIT DRAGLINE gives you these two important advantages . . . and many more. You get a one-piece cast main machinery gear case with all gears, shafts, and bearings operating in an oil bath; automatic traction brakes; twin hook rollers; and all disc-type operating clutches.

Your UNIT dealer has full information on ½ to ¾-yd. draglines, fully convertible to other front ends. See him soon for the full UNIT story.

UNIT

UNIT CRANE & SHOVEL CORP.
6409 W. Burnham Street
Milwaukee 19, Wisconsin

**SHOVELS:** ½ to ¾ YDS. • **HOES:** ½ to ¾ YDS. • **CRANES:** 5½ to 40 TONS • **DRAGLINES:** ½ to ¾ YDS.

*Enter 1030 on Reader Card*

*continued from page 232*

### Abrasion-resistant screw conveyors

A completely new line of abrasion-resistant screw conveyors has been made available with the development of a hard-facing technique for the wearing edges of the conveyor flights.

The leading edge of the screw conveyor is hard-surfaced with chromium boride powder which has been alloyed into the steel of the conveyor flight. This results in the most abrasion-resistant surface obtainable with hard-surfacing techniques, according to the maker of the hardening process.

As a result of this treatment, the screw conveyors can be used to handle the many abrasive materials common to the rock products industry—silica sand, cement, cement clinker, blast furnace slag and roofing granules. The new hardening technique is claimed to have increased conveyor life handling these materials over five times. (Industrial Machinery Co., Inc., 2400 So. Main St., Fort Worth, Texas)

*Enter 116 on Reader Card*

### Materials handling hose

A new line of flexible hose for gravity flow of materials has been made available. The wire-reinforced hose is made with a natural rubber inner liner and an outer cover of neoprene coated fabric. This construction results in high flexibility, resistance to internal abrasion, full cross section on bends and crush resistance.

Duraflo hose is not offered as a suction hose, but it has enough pressure capacity to handle gravity flow of clay slip, limestone slurries and silica sand suspensions, as well as gravity feeding of large volumes of dry, fine and abrasive materials. Sizes are available from 2 to 10 in. inside diam. and in lengths up to 15 ft. (The Flexaust Co., 100 Park Ave., New York 17, N.Y.)

*Enter 117 on Reader Card*

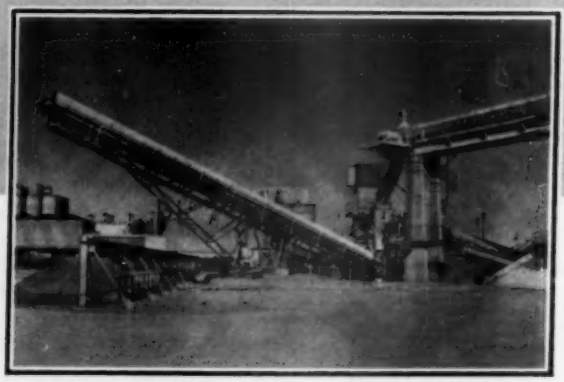
*Please turn to page 236*

THE BACKBONE OF ECONOMICAL CEMENT PLANT OPERATIONS . . .

MATERIALS HANDLING

"PIGGY BACK" CONVEYOR, Ark. Cement Corp., Foreman, Ark.

Coastal Plains was responsible for the design, the equipment and the erection of the entire belt conveying system of the Foreman plant of the Arkansas Cement Corporation.



"STACKER CONVEYOR" Ideal Cement Co., Ada, Oklahoma

Coastal Plains designed and furnished the entire plant system of belt conveyors to Ideal Cement Company for the new Ada plant.

SERVING THE CONSTRUCTION INDUSTRIES OF THE GREAT SOUTHWEST SINCE 1938

COASTAL PLAINS, INC. CPS SERVICE

P.O. BOX 10147, DALLAS, TEXAS • P.O. BOX 989, EL DORADO, ARKANSAS

*Enter 1070 on Reader Card*

**NEW** Pioneer *Hydro-Screen* Washing Plants are easily adapted to changing pit conditions and product requirements. Unitized to be transportable in sections

# Now...What's *your* aggregates washing problem?

● Whatever your problem, you may very well find that PIONEER has already designed and field-tested *your* answer . . . in one of its brand new family of *Hydro-Screen* Washing Plants!

**Planned for growth** as your business increases, there are many models to meet many needs . . . yet each is easily evolved from a simple basic design.

For example, Model 506-WT (shown above) has a 5′ x 12′ vibrating *Hydro-Screen*, a 10′ x 20′ Water Scalping Tank and a 36″ x 25′ Single Screw Classifier. It has a rated capacity of from 160 to 240 tph. Similar models with smaller or larger components for lesser or greater capacity are also available.

To meet other needs, there are other models, some without a Scalping Tank, others including a Revolving Scrubber. And, to any of these models you can easily add a Buzzer Screen for producing a fifth product, or Stockpiling Conveyors to augment or replace the bins.

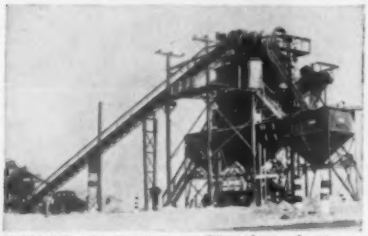
*What's more, any of these components can be added to a basic plant as your need arises. Not even structural members are wasted.*

**Unique new heart** of these remarkably adaptable, all-electric Plants is the PIONEER *Hydro-Screen*, which cascades material through high-pressure water sprays to wash it specification-clean.

In fact, the *Hydro-Screen* combination of 1) *spray bars on all 3 decks*, 2) the *step-deck* design of the second deck, and 3) the *circle throw* of the inclined vibrating screen is so effective that screening capacity is 2½ to 3½ times greater than of a dry screen.

**For all the facts** on PIONEER *Hydro-Screen* Washing Plants, see your nearest PIONEER Distributor listed below.

**PIONEER 306-W Washing Plant** is an efficient semi-portable Plant with built-in scrubber, revolving screens, and screw classifier, complete and ready to go. Later, if you wish, you can add crushers, stockpiling conveyors, and other screening and sizing units. Rated capacity is from 50 to 75 tons per hour.



**PIONEER 405-W Washing Plant** has giant capacity in dirty materials. Can produce up to 2 different sizes of sand, 5 sizes of stone simultaneously . . . at production rates up to 200 tph. Secret of high capacity is big revolving scrubber working with inclined 4′ x 20′ tandem vibrating screen.

Free Handbook

For your free copy of *Facts And Figures* (the most complete and comprehensive handbook for the aggregates-producing industry), write to PIONEER ENGINEERING, Minneapolis 14, Minnesota, or contact your Pioneer Distributor.

**Pioneer**
**ENGINEERING**
DIVISION OF POOR & COMPANY, INC.

*Enter 1031 on Reader Card*

*continued from page 234*

### Silicone motor protection

This manufacturer's line of variable-speed drives and gear motors can now be operated in locations previously considered too severe for drip-proof motors. Silicone shielding has been applied to the stator coil to form a smooth, flexible coating. The motors are thus protected against excessive moisture, oil, dust and the hazards typical in many rock products plants. (Sterling Electric Motors, Inc., 5401 Telegraph Rd., Los Angeles 22, Calif.)

*Enter 118 on Reader Card*

### Quick-opening manhole cover

When a grinding mill's ball charge must be removed, this new quick-opening manhole cover expedites the work. The new cover is merely a temporary device to let the maintenance crew open the mill safely, from a distance, with the manhole in the discharge position.

The mill is stopped with the hatch on top of the mill. In this convenient position the regular cover is replaced with the substitute cover. Then the mill is rotated to discharge position, with the manhole down. A lanyard is secured to the release latch; it is pulled when the crew is at a safe distance. After servicing the mill, the regular cover is replaced and secured. (Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.)

*Enter 119 on Reader Card*

### Chain clamp

A few turns of a handle can now secure rubber sleeves, couplings or elbows to steel pipe. A welded-steel coil chain, secured to a malleable iron head casting, loops around the rubber casing and the chain is drawn up with a 1-in. screw. This assures adequate pressure to secure the sleeve to hydraulic lines from 6 to 30 in. diam. One size clamp serves all pipe sizes. (Black Bros. Co., Inc., Mendota, Ill.)

*Enter 120 on Reader Card*

### Variable-speed sheaves

A new line of low-cost, variable-speed V-belt sheaves offers an economical speed changing device. Any one of the six sizes of the new sheaves can be readily installed on new or old drives ranging from fractional hp. up to 5 hp. Speed ranges of 3:1 or 4:1 are available and give the operator the opportunity to change speeds while the drive is in operation. (Lovejoy Flexible Coupling Co., 4938 W. Lake St., Chicago 44, Ill.)

*Enter 121 on Reader Card*

Model R3W-20 Floor Type
Handles x-type bits up to 5"—cross type up to 5½"

**LENGTHEN BIT-LIFE, LOWER DRILLING COSTS**

***With Detachable Rock Bit Grinder . . .***

You'll save time, labor and upkeep when you recondition your carbide-tipped rock bits on a Blount grinder. It's precision machine sharpening, far more accurate and five times faster than it could be done by the most skilled operator. You're sure of uniform, symmetrical grinding with the exact angles the manufacturer intended. Depend on Blount for

- Longer bit-life, more regrinds per bit
- Faster drilling
- Reduced drilling upkeep
- Lower cost per foot of drilling

***SOME OF THOSE WHO USE BLOUNT BIT GRINDERS:***

Merritt Chapman & Scott Company, New York
Ralf-Savin & Winkelman, New York
Shea-Kaiser & Morrison, California
Orinoco Mining Company (Subsidiary of U. S. Steel), Pennsylvania
Arch Dam Constructors, Utah
Mount Vernon Contracting Corp., New York
Subsidiary Companies of Bethlehem Steel Corp., Pennsylvania
Hanna Iron Ore Division (National Steel Corp.) Michigan
Jones & Laughlin Steel Corp., New York
Merritt Chapman & Scott Corp. of Panama, Balboa Canal Zone
James D. Morrissey Inc., Pennsylvania

**J. G. BLOUNT CO.**
Everett 49, Massachusetts
Div. Bowl-Mor Co., Inc.

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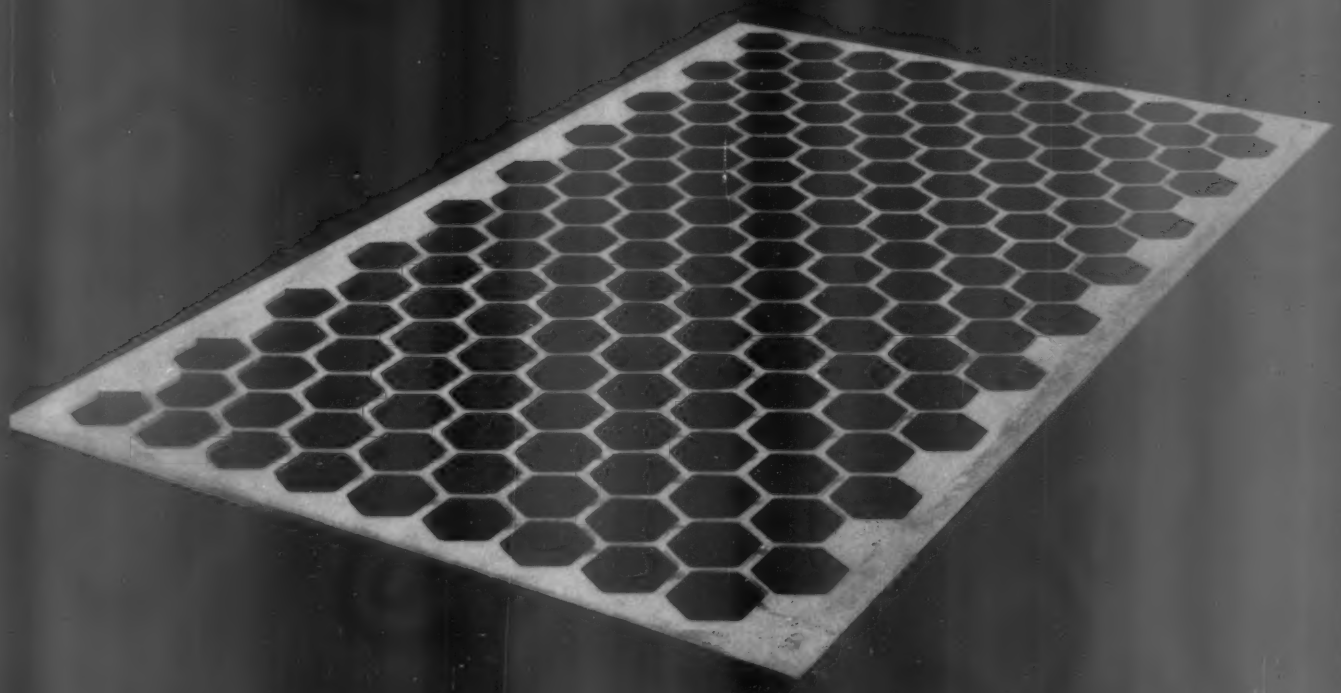


For rock products screening...

# Cross HEXCREEN* gives more uniform sizing, greater capacity

If you have been using woven wire screens or perforated metal screens with square or round openings, you will find that you can increase capacity, get more accurate sizing with CROSS HEXCREEN. The unique configuration of CROSS HEXCREEN (hexagonal shaped perforations), gives you more open area and less weight than equivalent square or round hole screens, yet provides the sizing accuracy of round type (see example at right).

CROSS HEXCREEN is specially designed for sizing granular products such as coal, coke, sand, gravel, crushed stone, slag, limestone, minerals and ores. CROSS perforated steel screens, made from long wearing CROSS Special Analysis Steel, are available in a wide range of sizes with uniformly spaced square, hexagon or round perforations, staggered for increased capacity and efficiency. For additional information on CROSS Perforated Screens write for complete catalog.

* T.M.

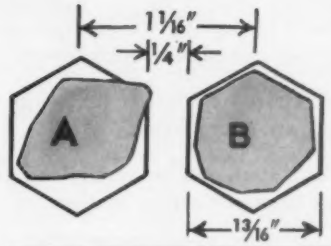
NS NATIONAL-STANDARD COMPANY

*Cross Perforated Metals*

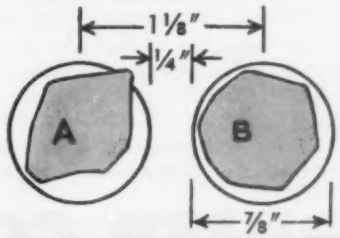
**NATIONAL-STANDARD COMPANY**

*Carbondale, Pa.*

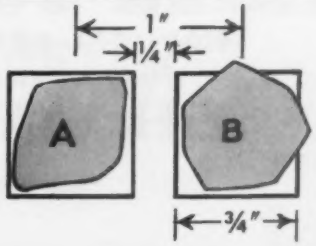
**EQUIVALENT OPENINGS**




13/16" Hexcreen Rejects A, Passes B, has 58.5% open area.

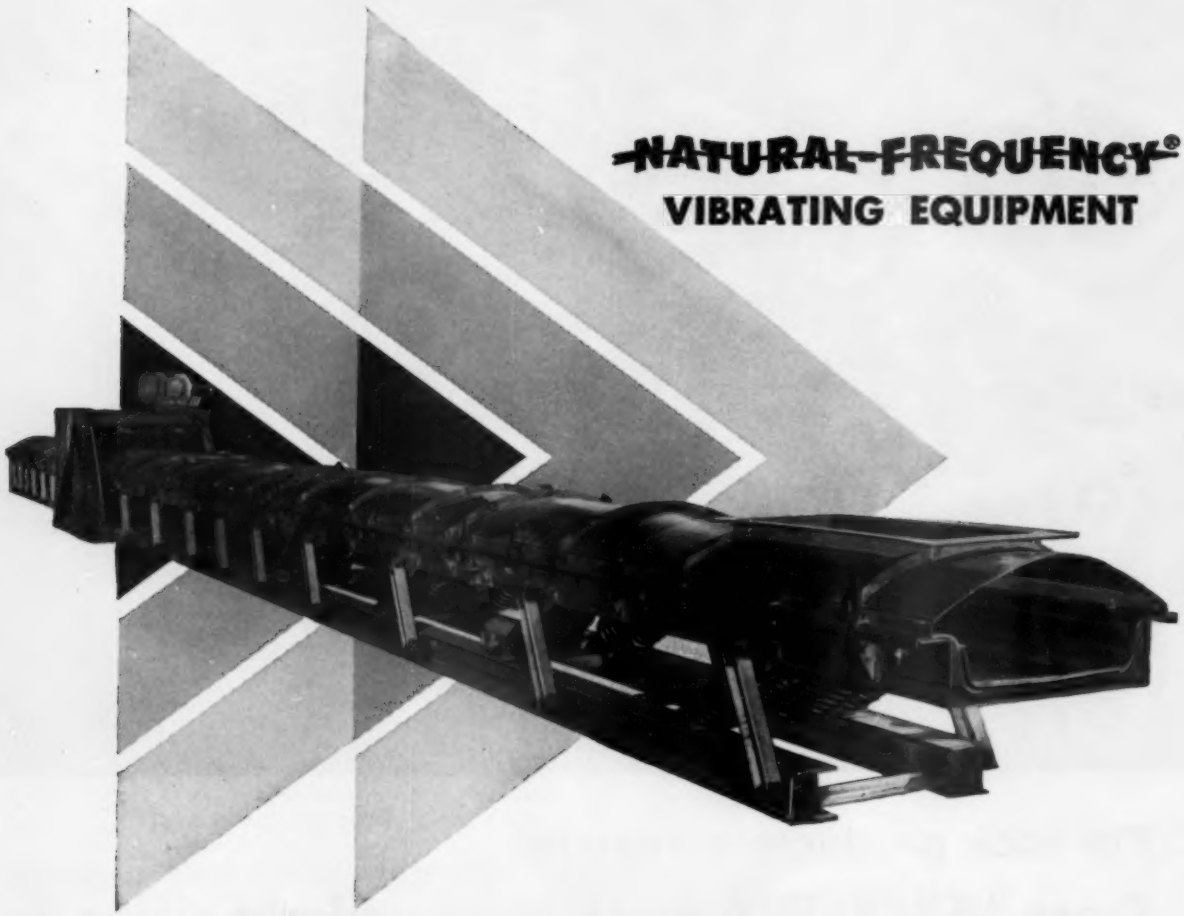



7/8" Round Rejects A, Passes B, has 54.8% open area.




3/4" Square Passes A, Rejects B, has 56.3% open area.

## NATURAL-FREQUENCY®
## VIBRATING EQUIPMENT



# CONTINUOUS RELIABLE SERVICE

▶ NATURAL FREQUENCY Design—uniform stress distribution, low horsepower.

▶ Overhead Drive—mounted over trough for accessibility; fast, easy service.

▶ No Moving Parts—to be maintained anywhere along conveyor except at drive.

▶ High-Temperature Construction—5′-long trough sections held with spring-loaded bolts through slotted holes, free to expand and contract without twisting structural members.

▶ Replaceable Troughs—trough sections held with spring-loaded bolts through slotted holes, are easily removed and replaced.

### CLEAN, DUSTPROOF OPERATION

▶ Gasketed Dust Covers

▶ Spillproof Troughs

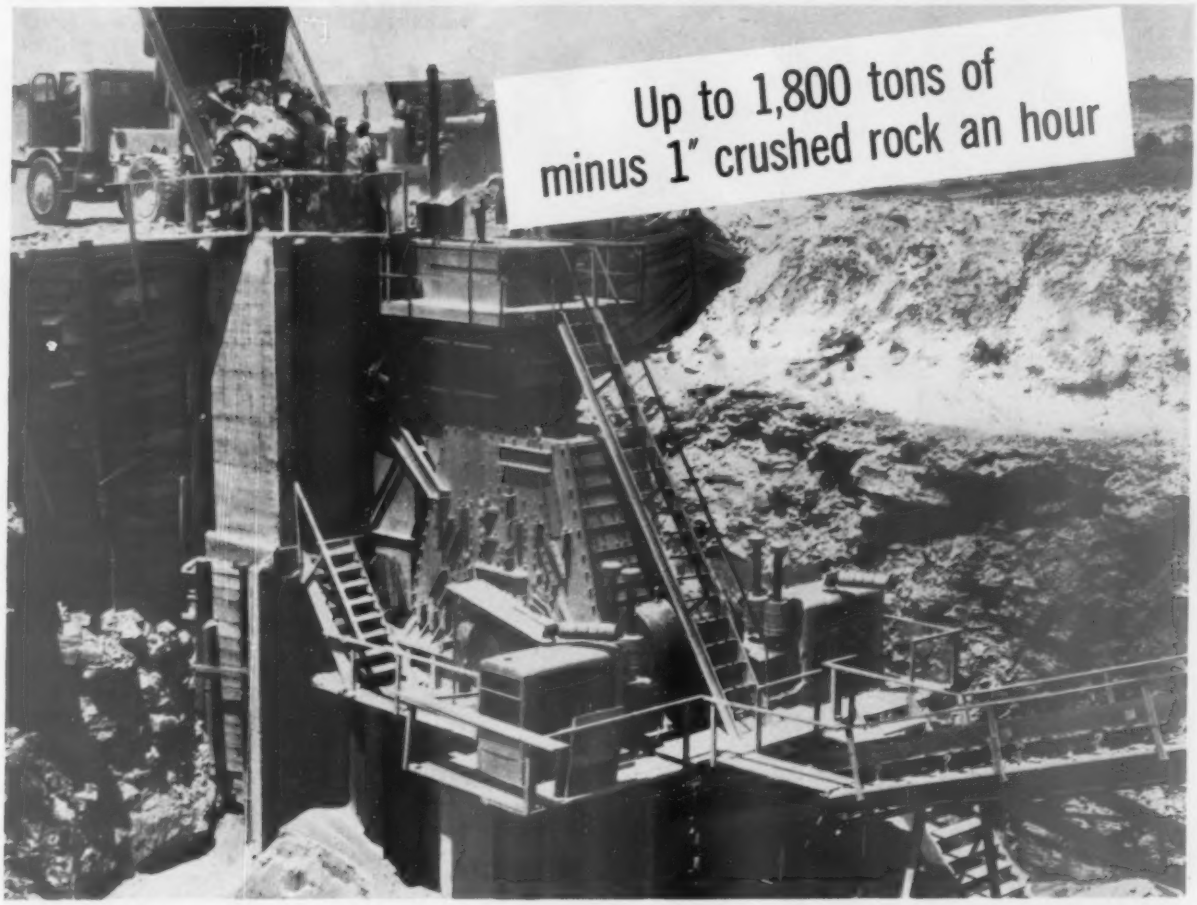
▶ Flanged Inlet and Outlet Connections

**For more information, write Carrier Conveyor Division, CHAIN Belt Company, 213 North Jackson St., Louisville 2, Ky.**

# CARRIER CONVEYOR
## NATURAL-FREQUENCY®
## VIBRATING EQUIPMENT
# CHAIN BELT COMPANY

*Enter 1120 on Reader Card*

# GET REAL PRODUCTIVITY—GET A GM DIESEL




**PROBLEM:** Providing over two million tons of road-base material without benefit of a natural gravel deposit or local electric power.

**SOLUTION,** as applied by Iowa's E. F. Schildberg Construction Company: Good planning, imaginative engineering and GM Diesel Power!

**RESULT:** High standard of productivity in completing a 33-mile stretch of superhighway west of Des Moines in 7½ months!

Schildberg Construction Company knew it was tackling a tough contract. The company set up its own, highly flexible quarrying and rock-crushing operation in a deposit of hard limestone near the project, and put 32 GM Diesels to work in scrapers and earth-moving trucks . . . in pug mills, impactors and portable rock-crushers, and in generator sets to power a complex of conveyors. In high gear, this efficient plant turned out as much as 1,800 tons of minus 1" crushed road-base rock an hour!

"We're mighty proud of our production record," says owner E. F. Schildberg. "We kept 'Jimmy' Diesels working at peak load, and, even under extremely dusty quarry conditions, they required very little upkeep. We're pretty strong 'Jimmy' Diesel boosters . . . without the dependable GM Diesel engine, we would never have set the production standard we did."

Whatever you use power for—trucks, crushers, compressors, shovels, or any other quarrying job—you'll find a GM Diesel will speed your work and save you money. Your GM Diesel distributor can prove it. Call him—he's in the Yellow Pages under "Engines, Diesel"—or write direct for more information.

GM DIESEL

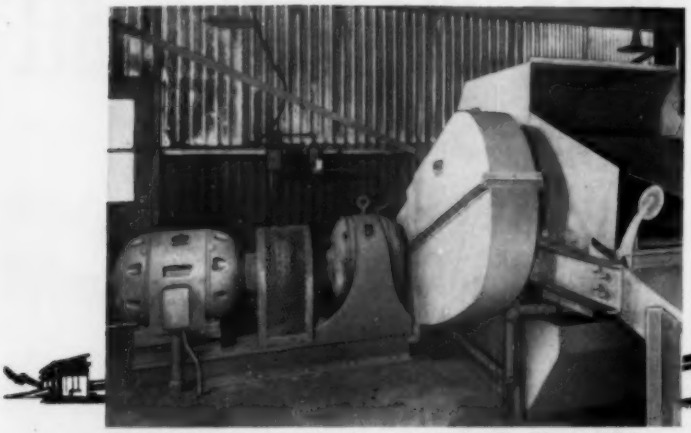
DETROIT DIESEL ENGINE DIVISION,
GENERAL MOTORS, DETROIT 28, MICH.

In Canada: GENERAL MOTORS DIESEL LIMITED, London, Ontario
Parts and Service Worldwide

## GM DIESEL ALL-PURPOSE POWER LINE sets the standard of Diesel productivity

*Enter 1090 on Reader Card*

# FOOTE BROS. DRIVES IN THE CEMENT INDUSTRY



## ...Move Cement Clinker at 2000 TONS PER HOUR

*LINE-O-POWER Reducer Driving Tunnel Belt feeding Final Conveyor Belt.*

*MAXI-POWER Reducer Driving Final Conveyor Belt, Universal Atlas Cement Plant, Buffington, Indiana*

Lake carriers get a fast turn-around when they load clinker at United States Steel Corporation's Universal Atlas Cement Plant at Buffington, Indiana, because the clinker loading belts driven by Foote Bros. Reducers have a maximum capacity of more than 4 million pounds per hour!

The 48" wide, 2445 ft. long inclined Final Conveyor Belt, driven by a Foote Bros. MAXI-POWER Parallel Shaft Drive, which is fed by two 36" wide Tunnel Belts equipped with LINE-O-POWER Drives, moves the fused raw material from mountain-high stock piles into the holds of boats at the rate of 2000 tons per hour.

This is tough, demanding service. Drives are subjected to massive shock and maximum peak loads . . . yet the Foote Bros. Drives have never been shut down for emergency repair or maintenance!

Dependability like this is a standard by-product of Foote Bros. drive know-how. Why not take advantage of our more than a century of experience and specialization in building high quality transmission products?

*There's a Foote Bros. Drive made to meet your power transmission requirement. Ask your nearby Foote Bros. Authorized Distributor for information or assistance concerning your power transmission problems. He's ready to help you.*

**FOOTE BROS. GEAR AND MACHINE CORPORATION**

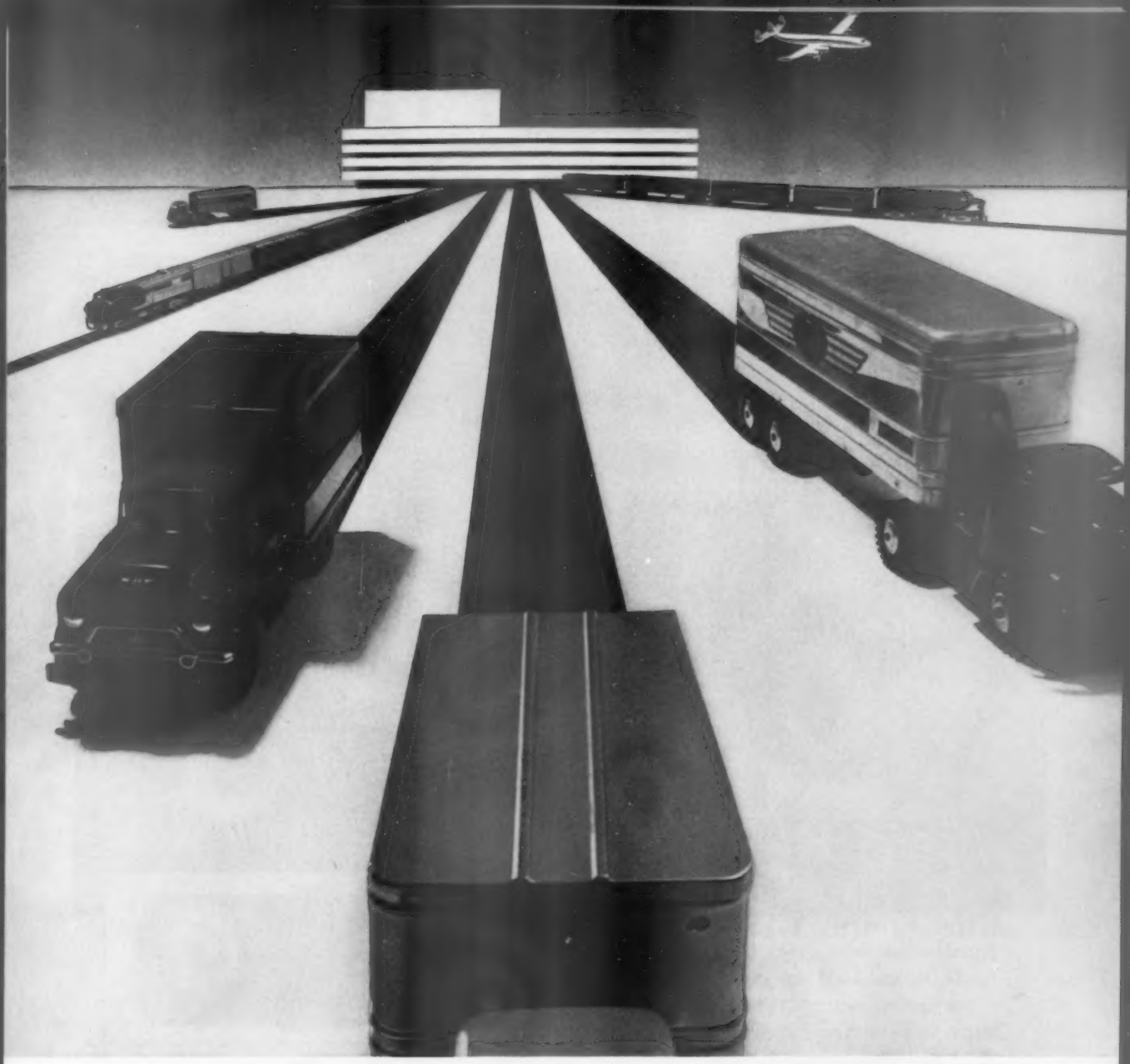
4589 South Western Boulevard, Chicago 9, Illinois

*POWER TRANSMISSION DRIVES*

*Enter 1144 on Reader Card*



*Enter 1147 on Reader Card*



## Stepped-up service for stepped-end bag users!

**New facilities installed at Kansas City, Houston and Toledo plants.** *Now* you can count on St. Regis® for stepped-end bags from the largest facilities in the industry. Eight plants located in key areas from coast to coast give you a stepped-end bag production and delivery service designed to meet any packing schedules.

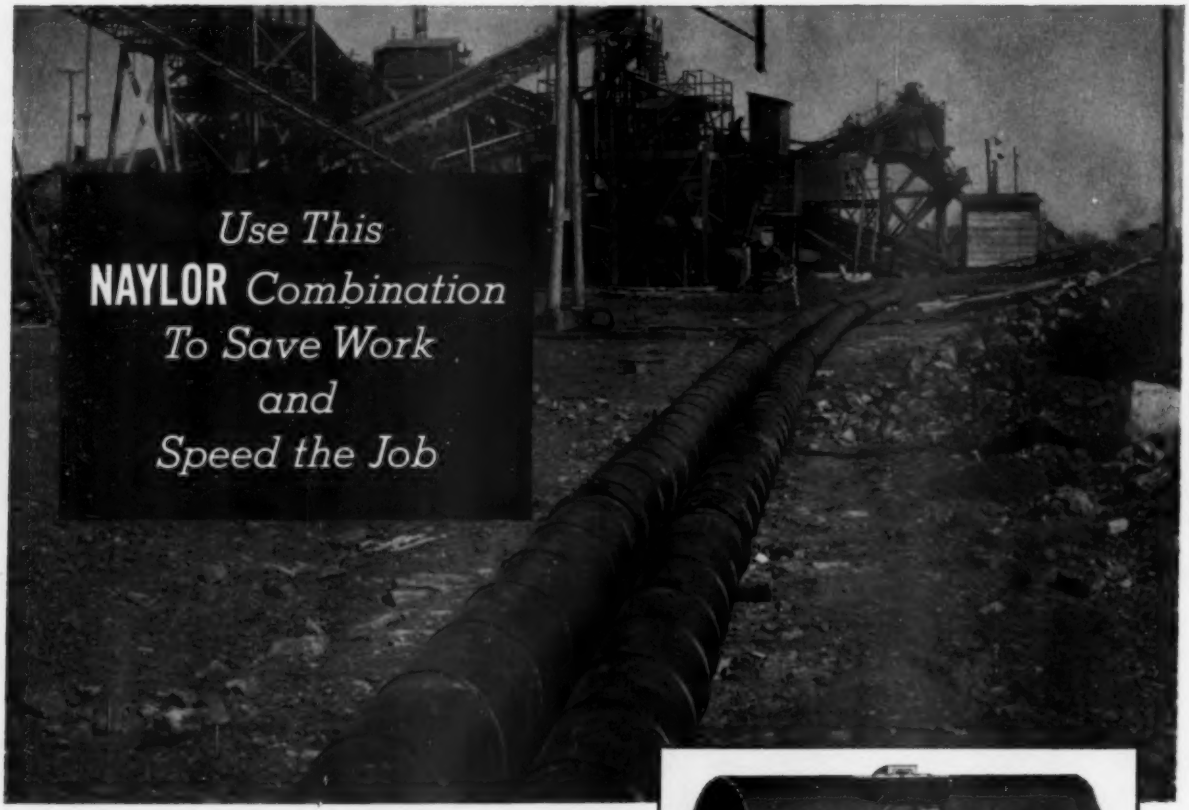
The Stepped-End Bag, invented and developed by St. Regis, provides a cleaner, stronger, and easier-filling bag tailored to the needs of the rock products industry. Now you are assured of a constant supply, delivered when you need it from our plants in Tacoma, Los Angeles, Nazareth, Pa., Kansas City, Franklin, Va., Pensacola, Houston and Toledo.

This is the most complete bag service available . . . this is *Packaging-in-Depth* in action!

BAG DIVISION

**Packaging-in-depth by St.Regis PAPER COMPANY**

# ACCENT on Faster Piping Installation



The NAYLOR Wedgelock coupling makes a positive connection, securely anchored in standard weight grooved ends. A hammer is the only tool needed to connect or disconnect it.

For short cuts to long lines, it will pay you to team up NAYLOR Spiralweld pipe and Wedgelock couplings.

The light weight of NAYLOR pipe makes it easy to install—whether you suspend it, support it, string it along the surface, or bury it.

You save even more time when you make connections with the NAYLOR Wedgelock coupling which is designed for faster, easier and more economical installation.

For air, water or tailings service, you'll be time and money ahead to specify this NAYLOR combination.

**Write for Bulletin No. 59**

**NAYLOR PIPE** *Company*

1237 East 92nd Street, Chicago 19, Illinois

**Eastern U.S. and Foreign Sales Office**
60 East 42nd Street, New York 17, N. Y.

*Enter 1091 on Reader Card*



*Enter 1119 on Reader Card*

Universal's Screenmaster working in the Barton Construction Co. pit near Rosemont, Minn. As a result of its outstanding performance in sizing material for their various paving jobs, Barton recently purchased a Universal Portable Crushing Plant equipped with a Universal Low-Boy Screenmaster.

# FLOATS ON AIR AND RUBBER . . . A SUPERIOR PERFORMER EVEN IN DAMP OR WET MATERIAL

A proved combination of air springs and rubber-bushed phasing bars has made Universal's Screenmaster the standard for profitable production. Owners and those who have seen it in action call it the most efficient screen developed in years.

### Eliminates Leaf and Coil Springs

The Screenmaster floats on air and rubber. Gone completely are the old metal leaf and coil springs. And with them. . . their destructive violence. . . their unpredictable reaction to loads . . . their unnecessary wear on basket and cloth. . . their high cost of continuous replacement!

Its exclusive features combine to give the Screenmaster the most aggressive screening, the most positive separation, the lowest maintenance and the greatest capacities ever.

The screen, with its exclusive air springs and rubber-bushed phasing bars, acts as a single unit, transmits smooth, sharp and aggressive action over the entire screening area. *The air springs* replace conventional coil springs . . . cushion and absorb shock while *the phasing bars* control the screen, eliminate the destructive, corner to corner violence of ordinary screens.

Snappy aggressiveness produced by this exclusive combination, prevents blinding, blanketing or squatting. . . cuts through wet or damp material quickly — resulting in greater capacity and higher profit. The Universal Screenmaster also gives you more screening area. Its rugged feed box absorbs and distributes material over full width of screen deck; a precision engineered power unit gives you long trouble-free life.

Put this profit-making Universal Screenmaster to work for you. There's a size for every requirement. Your Universal Distributor can help select the best for your operation whether stationary or portable.

PETTIBONE
UNIVERSAL
In Cedar Rapids Since 1906

## UNIVERSAL ENGINEERING CORPORATION

**617 C Avenue N.W., Cedar Rapids, Iowa**

Subsidiary of Pettibone Mulliken Corporation, 4700 W. Division Street, Chicago 51, Illinois

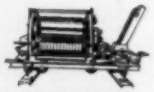
# 40,000 ABRASIVE TONS

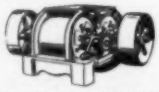
Grinding over 40,000 tons a year of lightweight aggregate produced by a patented process from bituminous coal refuse is the job of this AMERICAN #9 GRINDER, owned by Trulite Corporation, Ceredo, West Virginia.

C. M. Howard, general manager, comments, "We choose the AMERICAN #9 GRINDER because of its reputation for durability and low maintenance. Our aggregate is extremely abrasive but the AMERICAN requires much less maintenance than other grinders we have used."

If the reduction of lightweight aggregate, cinders, pumice, haydite, slag, other mine and quarry products presents a problem in your plant investigate these AMERICAN features: Grinds wet or dry, no screen plates required, suspended mullers are adjustable to volume and size requirements, long wearing gears are cast material, only 25 horsepower required.

*Do your job the AMERICAN way.*

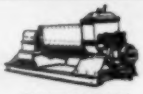

ELECTRIC CUTTERS


SMOOTH ROLL CRUSHERS

DISINTEGRATORS

PUG MILLS

GRINDERS


COMBINATION DE-AIRING MACHINES

American
CLAY MACHINERY
A DIVISION OF
HUBER-WARCO COMPANY • Marion, Ohio, U.S.A.

*Enter 1138 on Reader Card*

E-M-pioneered Incher provides quick, safe spotting of mills. It turns mills literally inch-by-inch to desired position merely by pushing a button. One E-M Incher Control can be used to spot several mills.

## At Carbon Limestone Company...

# "E-M INCHER SAVES US $1,600 A YEAR"

### ... cuts starter maintenance by over 90%

● At Carbon Limestone Co., Hillsville, Pa., a limestone pulverizing mill must be stopped and spotted every four hours for lubrication. Spotting formerly took about 15 minutes and was done by "jogging" (flicking the starting switch to give the mill a momentary jolt of power). This slow, "hit-and-miss" method resulted in frequent production halts for repairs to the overworked starting system.

To remedy this situation Carbon Limestone installed an E-M Incher. Result: Push-button spotting requiring only *one minute.* In the words of General Superintendent U. F. Masson:

The E-M Incher ... *"Increased productive hours of pulverizing mill 30 minutes in each 8 hours or 6¼%. Reduction of maintenance of starting equipment 90%."*

The E-M Incher can save you big money, too, if you are now using one of the old, time-consuming methods of spotting synchronous motor driven mills.

Write the factory now for complete information about the Incher, and call your nearest E-M Field Engineer.

This mill at Carbon Limestone Co. is quickly positioned by the E-M Incher Control shown in the large illustration.

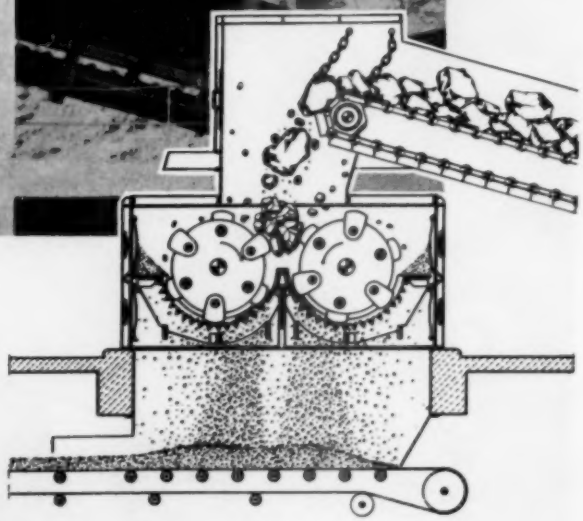
E-M

3100-TPA-2181

**ELECTRIC MACHINERY MFG. COMPANY**
MINNEAPOLIS 13, MINNESOTA

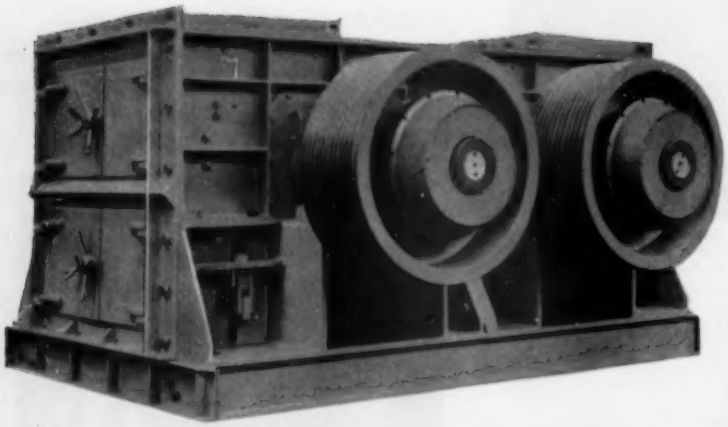
*Specialists in making controls do*
EXACTLY WHAT YOU WANT THEM TO

*Enter 1139 on Reader Card*



# MIAG-

## double-hammer-crusher „TITAN"



for
crushing quarry materials
down to a grain size
below 25 mm
capacity: 600 t/hr
Process: one stage process

**MIAG**
BRAUNSCHWEIG (Western Germany)

Enter 1092 on Reader Card

**Representatives**

for U.S.A.
**MIAG NORTHAMERICA INC.**
1616 SOUTH 8TH STREET
MINNEAPOLIS 4, MINN.

for Canada
**THE TRIMONT CORP.,LTD.**
P. O. BOX 25, STATION H
MONTREAL P. Q.

## READER-SERVICE CARD

RP-5-60

**ROCK PRODUCTS**
79 W. Monroe St.

**MAY, 1960**
Chicago 3, Illinois

**Cannot be serviced after July 1, 1960 postmark.**

Please print or type

Name_____ Position_____

Company (In Full)_____

Company Address_____ City_____ Zone____ State_____

Send information on items identified by key numbers beside or below items of interest to you. List your choice in numerical order. Limit 10 per card.

(1) ..... (2) ..... (3) ..... (4) ..... (5) .....

(6) ..... (7) ..... (8) ..... (9) ..... (10) .....

IF NO KEY NUMBER, USE COMPANY NAME

BUSINESS REPLY CARD
No Postage Stamp Necessary If Mailed in the United States

FIRST CLASS
PERMIT NO. 1417
CHICAGO, ILL.

– POSTAGE WILL BE PAID BY –

**ROCK PRODUCTS**
79 WEST MONROE ST.
CHICAGO 3, ILL.

# MONEY-MAKING IDEAS FOR YOU - - - FREE

### HOW TO USE THIS SERVICE

1. **Advertised Products**
2. **New Machinery**
3. **New Literature**

There is a wealth of valuable information in the manufacturers' booklets offered in this issue. For your convenience, each advertisement, each new machinery and new literature item has been given a key number. Simply fill in the proper key number in the appropriate space on the card above and send it to us. We'll do the rest.

BUSINESS REPLY CARD

No Postage Stamp Necessary If Mailed in the United States

FIRST CLASS
PERMIT NO. 1417
CHICAGO, ILL.

– POSTAGE WILL BE PAID BY –

**ROCK PRODUCTS**

79 WEST MONROE ST.

CHICAGO 3, ILL.

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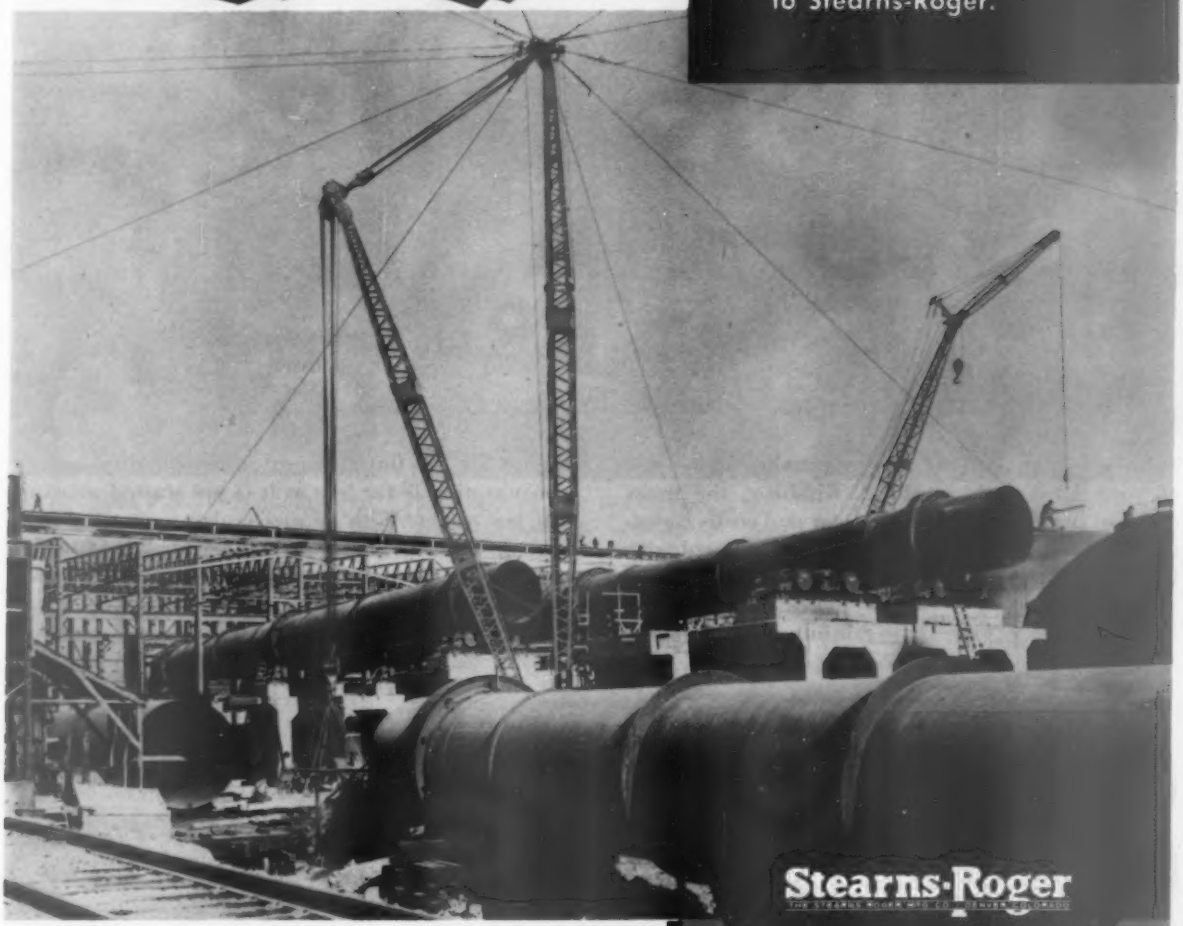
STEARNS-ROGER BUILT

for

# THOUSANDS OF BARRELS OF CLINKER

Two cement kilns each ten feet in diameter by four hundred feet long represent but one step in Stearns-Roger's complete service for design, engineering, fabrication and construction of cement plants. Call on the skill of qualified engineers working from long experience. For a smooth running plant, give the assignment to Stearns-Roger.



Stearns-Roger

THE STEARNS-ROGER MFG. CO. DENVER, COLORADO

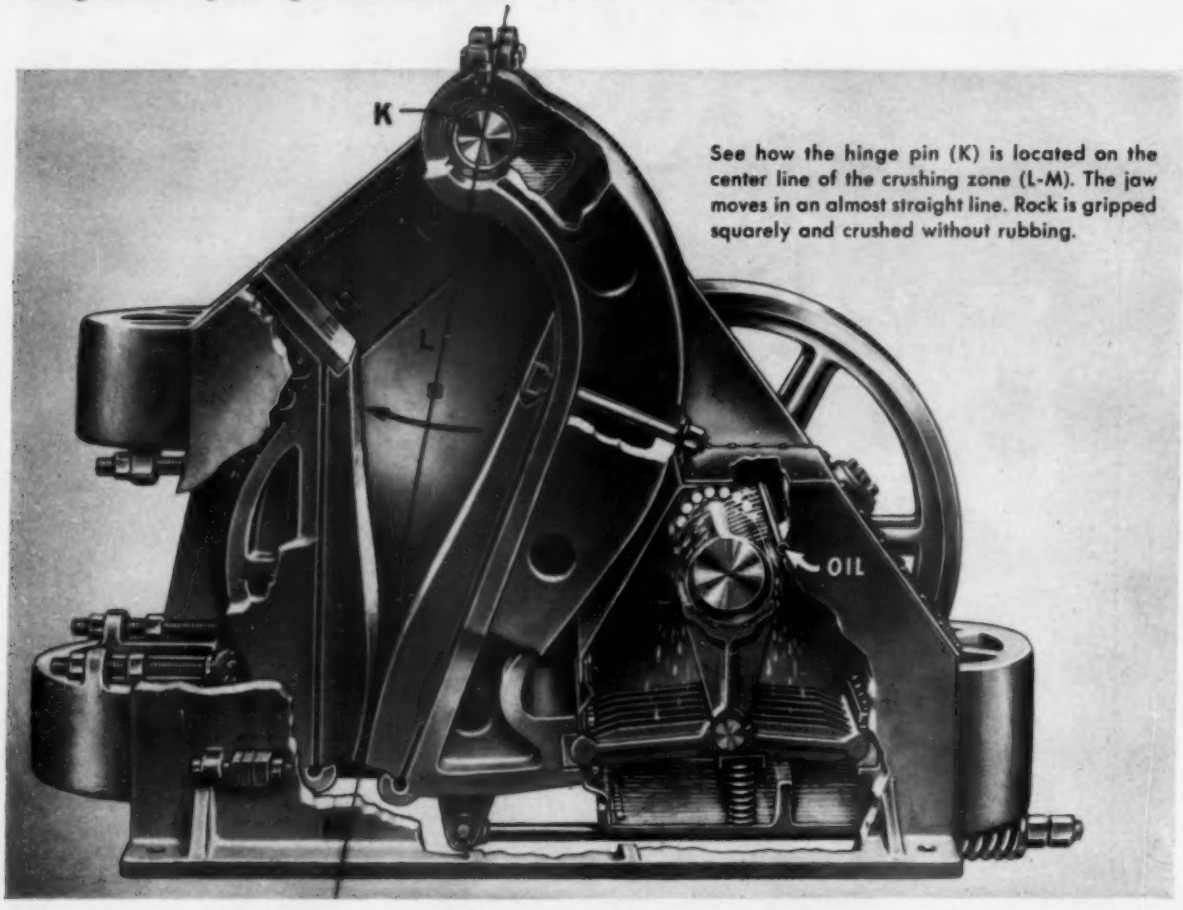
*Design, Engineering, Fabrication, Procurement, Construction*

DENVER, HOUSTON, SALT LAKE CITY

STEARNS-ROGER ENGINEERING COMPANY, LTD., CALGARY

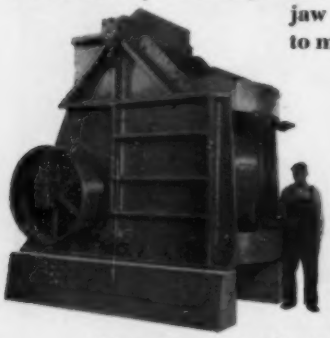
*Enter 1089 on Reader Card*

# KUE-KEN® "crushing without rubbing" saves on power . . . lengthens jaw plate life at least 5 times!




See how the hinge pin (K) is located on the center line of the crushing zone (L-M). The jaw moves in an almost straight line. Rock is gripped squarely and crushed without rubbing.

Take the high cost of crusher maintenance out of your hard rock crushing. Rubbing, the main cause of premature jaw plate wear and costly down-time with conventional crushers is eliminated with Kue-Ken. By crushing without rubbing, Kue-Ken jaw plates are subjected to minimum abrasion and last at least 5 times longer. Consequently, power consumption is far less as it is not wasted wearing out jaw plates. With its mechanism operating in a sealed, dust-free crankcase lubricated by filtered oil, Kue-Ken crushes at higher speeds for greater capacity. This often permits using a smaller, lower cost crusher. An automatic flywheel release prevents breakage from tramp iron. On any hard rock job, Kue-Ken crushes at lowest cost per ton.



*WRITE FOR CATALOG*

## KUE-KEN® CRUSHERS

*"Crushing Without Rubbing"*

**STRAUB MFG. CO., INC. 8381 Baldwin St., Oakland 21, Calif.**

Jaw Crushers · Gyratory Crushers · Overhead Eccentric Crushers
Revolving Screens · Classifiers · Feeders · Rib Cone Ball Mills
Concentrating Tables · Vibrating Screens

**DEALERS:**

| | |
|---|---|
| SAN FRANCISCO, CALIF. | Aggregate Engineers, Inc. |
| SEATTLE, WASH. | Washington Machinery Co. |
| BUTTE, MONTANA | Hall-Perry Machinery Co. |
| VANCOUVER, B. C. | Universal Equipment Co. |
| SALT LAKE CITY, UTAH | Lund Machinery Co. |
| SAN ANTONIO, TEX. | Closner Equipment Co. |
| LOS ANGELES, CALIF. | Garlinghouse, Freeman Co. |
| PORTLAND, OREGON | Air-Mac, Inc. of Oregon |
| BISMARCK, NORTH DAKOTA | Midwest Equipment Co. |
| PHOENIX, ARIZ. | Road Machinery Co. |

Pennsylvania Crusher Division, Exclusive Licensed Eastern Manufacturer and Distributor, 323 S. Matlack St., West Chester, Penn.
Armstrong Whitworth (Metal Industries) Ltd., Authorized Licensed Manufacturer and Distributor. Close Works, Gateshead-upon-Tyne 8, England

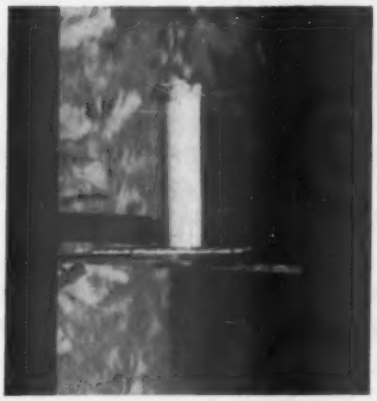
*Enter 1093 on Reader Card*

# Birth Of A Blast

Many unique tools are used by Spencer Chemical Company in blasting research. For example, these exclusive photos, taken at intervals of seven millionths of a second by a special camera, record the detonation of a 4-lb. mixture of Spencer N-IV Ammonium Nitrate and fuel oil.

Research like this, conducted by Spencer's own staff, and sponsored by Spencer at leading U. S. research centers, results in new and better ways to use Spencer N-IV and fuel oil for blasting.

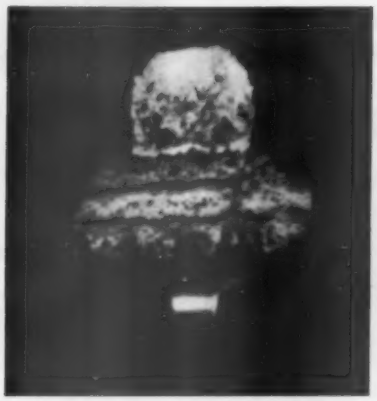
Spencer Chemical Company would like to share this knowledge with you. For information, use the coupon below.



**2:13 P.M.** The 13"-long charge, containing 94% Spencer N-IV Ammonium Nitrate and 6% fuel oil is about to be detonated.

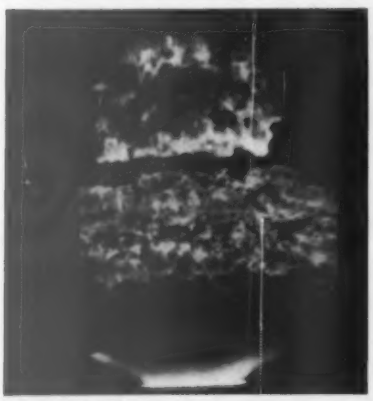
**2:13.000028 P.M.** The detonation wave has already spread over nearly one-third of the Spencer N-IV—fuel oil mixture.

**2:13.000056 P.M.** This mighty, but controllable, energy is partly a result of N-IV's special structure and greater nitrogen content.

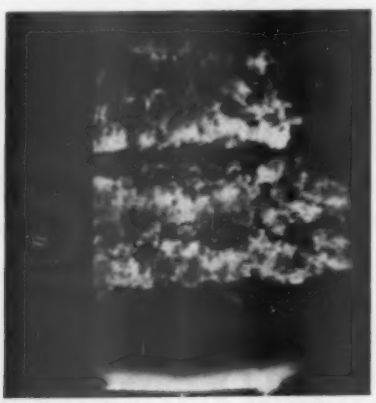


**2:13.000088 P.M.** Shown here is the great detonation velocity of the N-IV—fuel oil mixture. Yet, N-IV is safe to store and handle.

**2:13.000128 P.M.** The continuous and even release of energy shown here is a result of extensive Spencer research.



**2:13.000160 P.M.** Near maximum energy is now being released by the low-cost Spencer N-IV Ammonium Nitrate—fuel oil mixture.



**2:13.000184 P.M.** Full detonation! For information on how you can use Spencer N-IV Ammonium Nitrate, fill out, mail coupon at right.

SPENCER®

Spencer Chemical Company
405 Dwight Building
Kansas City 5, Missouri

I want to know more about:

☐ Spencer N-IV Ammonium Nitrate as a blasting ingredient.
☐ Spencer Powder Monkey.

Name_____

Firm_____

Address_____

City_____ State_____

*Enter 1141 on Reader Card*

# A case history of Bemis service that could mean a lot to you

*Our principal business, of course, is to sell bags in any honorable way.*

*But we much prefer to sell them through service, such as we have had the opportunity to render over the years to General Material Company, St. Louis.*

*The General Material–Bemis case history, related chronologically here, shows some of the many ways in which Bemis is able and anxious to work with customers:*

**1952** General Material Company, a ready-mix business packaging its product under the trade name "Pree-Mix," is launched. A Bemis specialist advises the young company on bag construction and design, and assists in setting up a packing line.

**1956** General Material outgrows initial plant, constructs new plant with much greater capacity. To handle the increased output, Bemis Packaging Service representatives work with company officials and install complete Bemis packing line: Bemis Gravity Packer, Vee-Trof Conveyor and Bemis Sewing Machine Pedestal. Mr. Martin W. Melican, plant superintendent, states that "the use of the Bemis Gravity Packer has been instrumental in doubling the output of our products."

**1960** Now an established company, General Material still receives close personal attention from Bemis multiwall specialist who keeps Mr. Melican and others informed of such new developments as Bemis Extensible Multiwalls. This close personal attention is typical of Bemis service.

*This case history deals with one specialized phase of the rock products industry—but it indicates the wide range of facilities, technical skills, and packaging experience that Bemis makes available to all customers. If you would like to discuss your own packaging operation with a Bemis man, write today.*

*Where flexible packaging ideas are born*

GENERAL OFFICES 408-M PINE STREET, ST. LOUIS 2 • SALES OFFICES IN PRINCIPAL CITIES

Enter 1143 on Reader Card

Lehigh
Portland Cement Company
relies exclusively on Buell Precipitators and Norblo arresters for dust control and the elimination of air pollution at its new Miami, Florida plant. In clincker handling and finish grinding, packhouse and crushing plant, Buell-Norblo bag-type dust arresters assure pleasant, safe, dust-free working conditions. And Buell Electric Precipitators make certain that the kiln exhaust gases are absolutely clean. There's no visible discharge from the stack under normal weather conditions, even though its height is limited by the C.A.A. Getting rid of air-borne waste is particularly important to Lehigh because the new plant is on one of the approaches to Miami's famed International Airport. • The recent acquisition of Norblo now allows Buell to offer a complete combination of systems for industrial dust collection and recovery. With Buell, you get the integrated know-how and experience for which there's no substitute. The Buell Engineering Company, Inc., 123 William Street, New York 38, New York. Northern Blower Division, 6404 Barberton Avenue, Cleveland, Ohio. (Subsidiary: Ambuco Limited, London, England).
Buell Dust Collection Systems: Cyclones/ Electric Precipitators / Bag Collectors / Combination Systems / Classifiers

## Buell-Norblo system solves unusually tough dust problem

buell
Norblo

*A NEW BOOK BY*

James A. Nicholson

**GIVES YOU THE SCORE**

"Ready Mixed Concrete", is an historical, authoritative account of one of the fastest growing industries in the world.

Written especially for people in the *Ready Mixed Concrete Industry* the book is a harvest of factual information on every fundamental phase of the business.

Give a copy to every employee who has a hand in YOUR reputation for quality mixes, and in YOUR profits. Order your copies today.

Single copies only $5.00 each. Five to Twenty copies $4.00 each.

**ROCK PRODUCTS**

79 WEST MONROE STREET

CHICAGO 3, ILLINOIS

Enclosed is my check (money order) for $_____. Please send at once _____ copies to: R-360

NAME .....

COMPANY .....

STREET .....

CITY ..... ZONE.....

STATE .....


# MANUFACTURERS NEWS

## Dodge wins "Best in Show" award

A DODGE TRUCK ADVERTISEMENT, competing with 5,000 entries, has been named "Best in Show" in the 15th annual Western Exhibition of Advertising and Editorial Art, sponsored by the Art Directors Club of Los Angeles. As a result, the Dillon Lauritzen Memorial Award—a coveted "Oscar" of advertising—has been presented to Ross Roy, Inc., Dodge Truck advertising agency, and Charles Wysocki, Jr., who painted the illustration in the ad. A special client's medal was awarded to Dodge. The prize winning ad was published last fall in ROCK PRODUCTS. This year's presentation was made during a ceremony in Los Angeles' Statler-Hilton Hotel, with television, stage and motion picture actor Hans Conried (center) serving as toastmaster.

## Napco appoints managers

D. EDWARD MANNING, director of sales and marketing for Napco Industries, Inc., has reported the appointment of two managers for Napco products. J. E. Stilwell was named manager for region 6, covering the states of California, Nevada, Arizona, New Mexico, Colorado and Wyoming. M. L. Garrettson was appointed manager of region 7 which includes the states of Washington, Montana, Idaho, Oregon as well as the Canadian provinces of British Columbia and Alberta.

## John G. Notheis appointed manager

DAYBROOK HYDRAULIC DIV., Young Spring & Wire Corp., Bowling Green, Ohio, has announced the appointment of John G. Notheis as the southern zone manager for the company. Previously he was north central zone manager.

Mr. Notheis has an extensive background in automotive and truck equipment sales and had operated his own automobile and truck dealership. Before entering the automotive and truck equipment field, he was branch manager for a finance company. After Feb. 1, 1960, Mr. Notheis' headquarters will be located at 1527 Knob Hill Drive, N.E., Atlanta 6, Ga.

*(Continued on page 256)*

## PERFORMANCE

Shipping silos for the Phoenix Cement Company, at Clarkdale, Arizona, from which the Type II cement for the mammoth Glen Canyon Dam will be shipped. Silos and conveying equipment were designed for continuous high-speed loading of the giant tandem trailers which will carry the cement in a 24 hour unending relay. Two of these rigs can be loaded at one time, one on each side of the silos. At the same time the high-efficiency packhouse takes cement from storage for bagging cement.

# MODERN IDEAS FOR A NEW PLANT

## PHOENIX CEMENT COMPANY

Clarkdale, Arizona

## EFFICIENCY

Raw material for burning is prepared in the two silo installation. One of the two blending silos on the left receives milled raw feed from the milling department while the other silo pumps material to the single homogenizing silo at far right. Bottom of the homogenizing silo is fitted with porous ceramic plates through which compressed air is pumped to agitate raw material. Silos and packhouse were designed and constructed by Macdonald Engineering Company of California, serving the rapidly expanding Western States.

**For Modernization, Expansion and Complete Plants, call**

## MACDONALD ENGINEERING COMPANY

CONSTRUCTING ENGINEERS

**149 New Montgomery Street**
**San Francisco, California**

**22 West Madison Street**
**Chicago, Illinois**

**2349 Yonge Street**
**Toronto, Canada**

*Enter 1146 on Reader Card*

*(Continued from page 254)*

## Kaiser subsidiaries change name

KAISER REFRACTORIES & Chemicals Div. has announced that the names of three of its sales subsidiaries have been changed to the name of the parent organization.

The Mexico Refractories Co. of Ohio, with offices at 3212 Lakeside Ave., Cleveland, and 802 Lafayette, Toledo, will now operate under the name of Kaiser Refractories & Chemicals. Robert Actman and Will Combs will continue to serve as district sales managers respectively.

A similar change has been made by the Mexico Refractories Co. of Texas, with offices at 2211 Walker Ave., Houston, and 151 Leslie St., Dallas. District headquarters will remain at Houston with L. L. Brightman as manager.

In Los Angeles, the Missouri Refractories Co. has changed its name to Kaiser Refractories & Chemicals. W. E. Daugherty will serve as district sales manager. This office will remain at 4555 Pacific Blvd., Vernon.

Kaiser Refractories has also announced the opening of a new sales office at 2901 E. 4th Ave., Columbus, Ohio, where Glen "Doc" Ames will serve as sales representative reporting to the Toledo district office.

## Sales manager named for P & H

KENNETH A. WILLIG has been appointed national sales manager for a newly-formed Small Excavator Div. at Harnischfeger Corp. The new division has been created "because of the constant requirement for progress in this highly competitive era."

In his new position, Mr. Willig will be responsible for directing field sales personnel and P&H dealers in the marketing of all machines of 20-ton capacity and under. His headquarters will be at Harnischfeger's general offices in Milwaukee.

## Arcair Co. promotes McEvilly

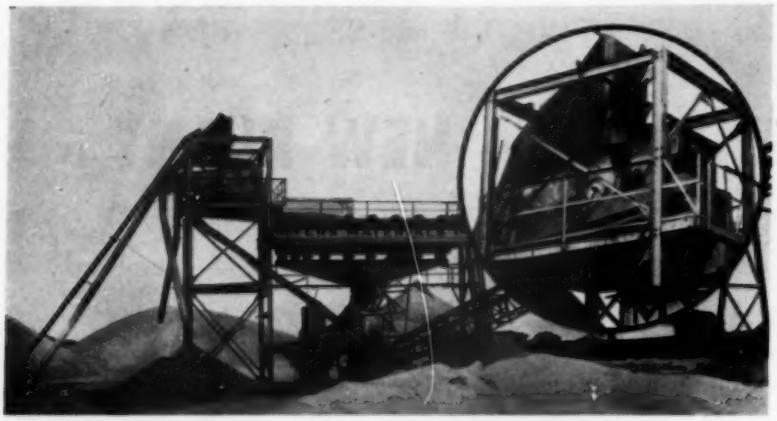
JERRY MCEVILLY has been appointed field representative for the Arcair Co., in the Chicago area. His territory will include more than nine mid-western states.

Before joining the Arcair Co., Mr. McEvilly worked for several national firms in a welding supervisory capacity, both in this country and abroad. He works out of Milwaukee, Wisc.

## Snavely promoted at Chain Belt

THE APPOINTMENT of J. Walter Snavely as assistant district sales manager of its Milwaukee district sales office has been announced by Chain Belt Co., Milwaukee. The appointment was effective March 1, 1960.

Mr. Snavely, now marketing man-

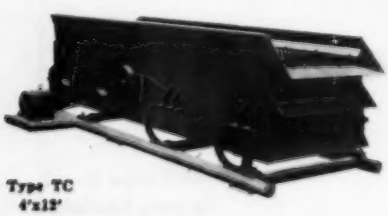
# 4'x12' KOLMAN Triple-Deck Screen Handles 120 Tons an Hour

Making specification aggregate in Southern Kansas calls for screening large volumes of fine material. When Mr. George Myers of Myers Materials, Inc. installed his new washing plant at Arkansas City, Kansas to produce concrete sand, engine sand and mason sand, his operation demanded a vibrating screen capable of handling fines effectively. His choice — a Model TC-120-48 KOLMAN Triple Deck Screen 12' long x 48" wide.

This high speed, vigorous action screen has proved itself fully capable of the rugged assignment. It receives material from the 8" pump at an average rate of 120-130 TPH. Everything under 2" hits the ¾" square opening screen cloth on the top deck, where less than 5% of the feed is removed. For certain specifications, a No. 4 screen is used on the middle deck.

But frequently the center screen is not used, and the full load of minus ¾" goes directly to the 6 mesh oblong opening bottom screen. Here 40% to 50% of the 120-130 TPH feed must pass, with a very minimum of carryover. Ralph Bridges, Plant Manager and John Bucher, Plant Superintendent, report that their KOLMAN Screen takes care of this separation beautifully. With slots running crosswise, the rapid, sharp stroke of the KOLMAN eliminates blinding on the 6 mesh screen in spite of the great amount of oversize on the deck and even in the most difficult areas of the pit.

KOLMAN Screens are designed for a wide variety of applications, including the toughest washing and crushing jobs as well as the light weight portable plant installations. Your KOLMAN dealer will be glad to provide you with complete data and the names of owners in your locality.



Type TC 4'x12'

WRITE FOR LITERATURE AND PRICES

**KOLMAN MANUACTURING CO.**

4200 W. 12th St. Sioux Falls, S. D.

*Enter 1103 on Reader Card*

ager of Chain Belt's conveyor equipment, joined the company in 1927. In 1934 he became sales manager of the Houston district sales office and in 1941 returned to Milwaukee as a sales and estimating engineer in the company's conveyor and process equipment division. Since then he has served in that division as an assistant to the sales manager, manager of engineering, manager of the conveyor equipment section and assistant division manager.

### Roberts joins Stulz-Sickles

PHILLIP J. ROBERTS has recently joined Stulz-Sickles Co. as district sales manager for metropolitan New York, New Jersey and Philadelphia. Mr. Roberts was formerly with RCA and duties will encompass full responsibility for distribution and sales of Manganal welding products.

### Robert C. Meissner named president of Meissner Engrs.

ROBERT C. MEISSNER has been named president of Meissner Engineers, Inc., Chicago. He previously was executive vice president and administrative officer for all projects in consulting and design.

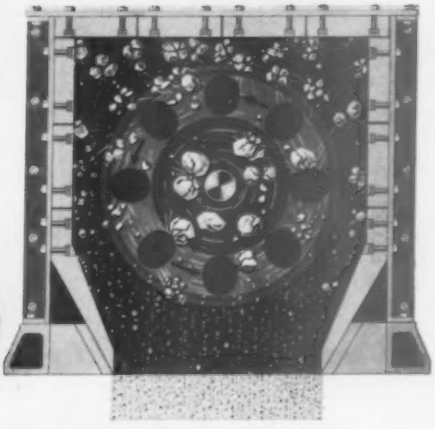
The firm, specializing in bulk materials handling and process plant design, was founded in 1949 by Mr. Meissner and his father, John F. Meissner. Once a two-man operation, the firm now employs more than 200 engineers. The firm's areas of activities include rock products plant design (beneficiating, etc.), other minerals plants, and civil engineering projects such as highways, bridges and sewage disposal.

*(Continued on page 258)*


# SIZE AND UPGRADE

YOUR AGGREGATES FOR BOTH CONCRETE AND BITUMINOUS MIX WITH

# STEDMAN CAGE MILL



The Stedman Single-Cage Mill reduces Gravel and Stone, either wet or dry, via the Internal-Impact Principle. See cut above. It pulverizes unsound material to be passed off with fines—the discharged product going to wet screens, log washer, jigs, or heavy media process.

The Stedman Single-Cage Mill not only upgrades your product, but also gives the greatest percent of crushed surfaces for Black Top Mix. Example: "Crush your—2"+¼" including pea gravel to a product of ¾" X 0, screen out minus ¼" sand and furnish a specification product for Bituminous Mix with 65 to 100% crushed particles."

Variation of speeds and type of cage result in a wide variety of product sizes. Wire or write for information.

**STEDMAN** FOUNDRY AND MACHINE COMPANY, INC.
*Subsidiary of United Engineering and Foundry Company*
AURORA, INDIANA, U. S. A.

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# ANALYZE FOR $Na_2O$ or $K_2O$ WITH ACCURACY IN ONE MINUTE

In analyses for alkalies, such as sodium and potassium oxides under ASTM Spec. C114-51T, the Perkin-Elmer Model 146 Flame Photometer delivers reliable results. Internal standard or direct-intensity reading from AC drift-free electronics gives fast routine analyses, accurate to within one percent.

The Model 146 operates with any commercially-available gas and air, is designed for simplified, convenient operation. It uses regular electric utilities, and includes rugged self-contained meter and phototube circuits.

*Write for Perkin-Elmer's illustrated brochure on the Model 146 Flame Photometer.*

INSTRUMENT DIVISION
**Perkin-Elmer** *Corporation*
NORWALK, CONNECTICUT

*Enter 1105 on Reader Card*

*(Continued from page 257)*

## Sales representative appointed at Columbia

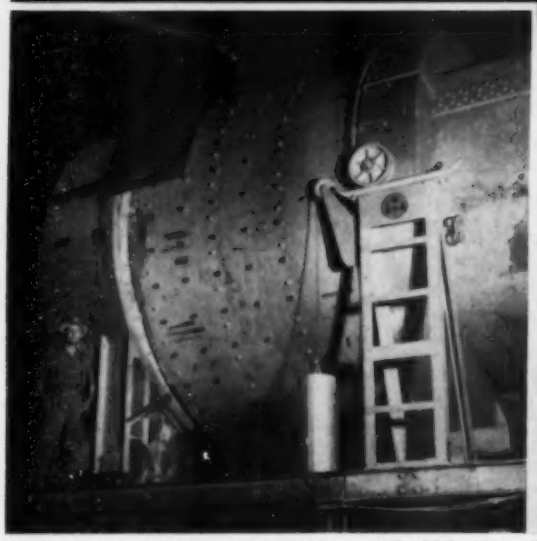
THE APPOINTMENT of William G. Nelson as Southwestern sales representative of Columbia Steel Casting Co., Inc., of Portland, Ore., has been announced by H. M. Bird, president of the company.

Mr. Nelson, with headquarters in Los Angeles, will serve central and southern California, western Nevada, Arizona, New Mexico and west Texas. He will service mines and steel mills which use Columbia industrial components, but his primary responsibility will be the many Columbia dealers in the area.

## Stewart appointed vice president

APPOINTMENT OF Robert F. Stewart as vice president and assistant general manager of Western Precipitation Div. of Joy Mfg. Co., Los Angeles, Calif., has been announced. Prior to this appointment, Mr. Stewart has been vice president for sales of dust collecting equipment of the division. He has served in a number of capacities including sales engineer, chief estimator and sales manager since joining Western Precipitation in 1946. In his new position he will direct and control all departments and activities of the Western Precipitation Div. under direction of the general manager.


**MANITOWOC Recuperators**
**Can Increase Rotary Kiln Output Up to 30%!**



Manitowoc Type S Recuperator mounted on unit-fired kiln 11' x 400'.

★ *Rapid air quenching and cooling*

★ *Instantaneous ignition of air-fuel mixture*

★ *Increased production*

★ *Highest heat exchange efficiency*

★ *Greatly improved grindability*

★ *Substantial fuel savings*

Here's why Manitowoc Recuperators have improved rotary cement kiln performance in numerous world-wide installations:

1. The active cooling surface is engineered into the smallest possible area, allowing the cooling air to contact the clinker before it has begun to chill. 2. Pre-heated air travels the shortest possible distance, reducing heat loss. 3. Heat loss through radiation is almost eliminated. 4. Pre-heated secondary air volume contacts the primary air-fuel mixture in a highly turbulent condition, assuring instant ignition.

*See how Manitowoc Recuperators will increase your kiln output. Write today for this informative catalog.*

**MANITOWOC SHIPBUILDING, INC.,** *Manitowoc, Wis.*

*(A subsidiary of The Manitowoc Company, Inc.)*

*Enter 1106 on Reader Card*


## Ehrsam appoints Andreas

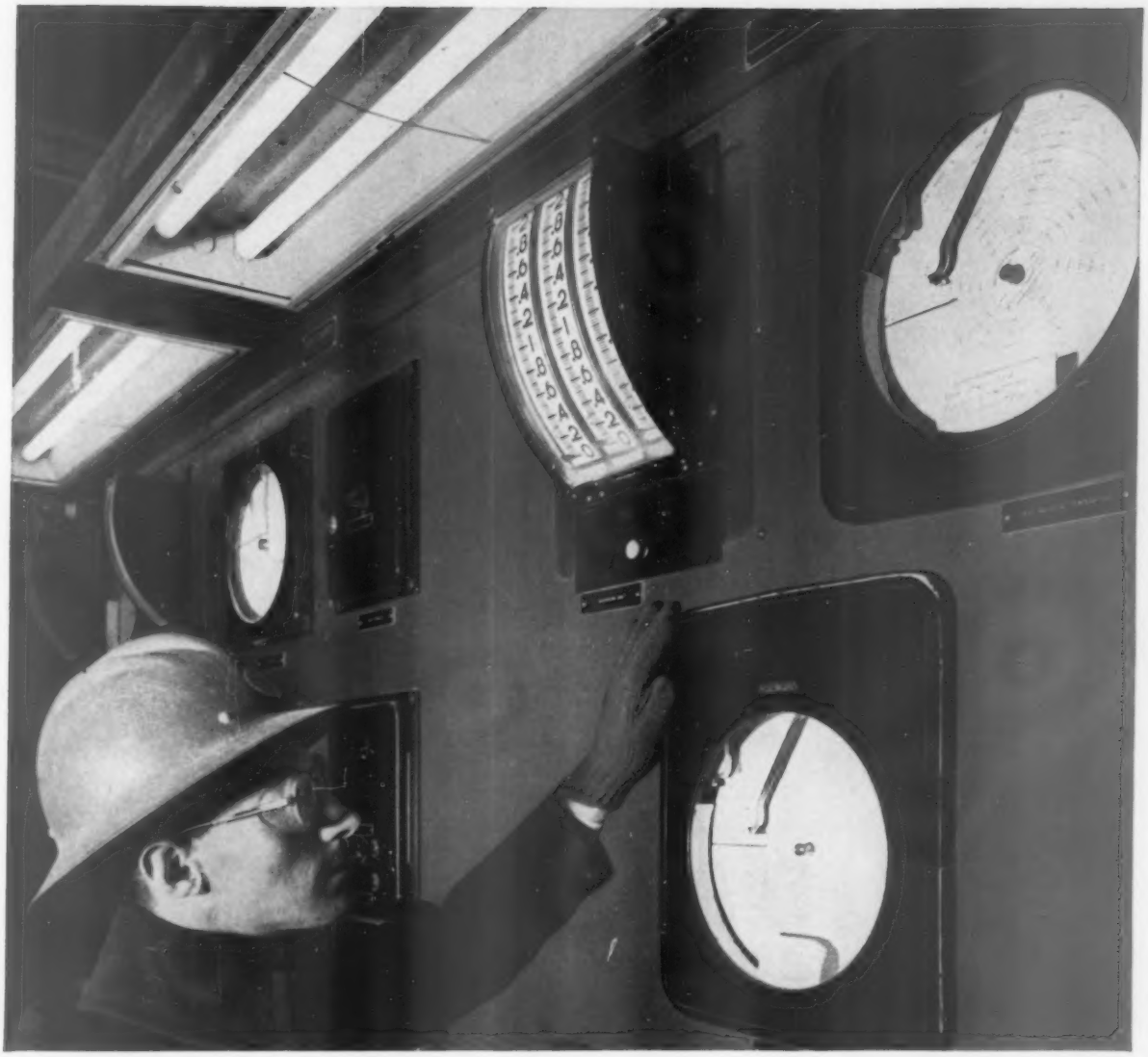
THE J. B. EHRSAM & SONS Mfg. Co. of Enterprise, Kansas, announces the appointment of Charles E. Andreas to succeed D. M. Ehrsam as manager of the company's Gypsum and Wallboard Machinery Div. He has a broad background of practical knowledge of the industry including serving as plant manager in a large fibreboard firm. The division office will remain at 385 New Brotherhood Bldg., Kansas City, Kans.

## Atlas Powder appoints Shearer

ANDREW W. SHEARER has been appointed as technical press representative in the public relations department at Atlas Powder Co. He will also serve as editor of "The Atlas Family," company employe magazine.

Mr. Shearer will be available to work with trade magazine editors in developing stories of interest to their specialized readerships concerning chemicals and explosives. He assumes his new position with a background of 12 years of editorial experience, most recently with Chilton Co., Philadelphia, Pa., where he was Market Research Editor of "Automotive Industries" magazine.

*(Continued on page 260)*



# it's low-maintenance Foxboro Dynalog* Recorders at Universal Atlas Cement Division of U. S. Steel...

## instruments have run continuously since 1953 with only occasional maintenance

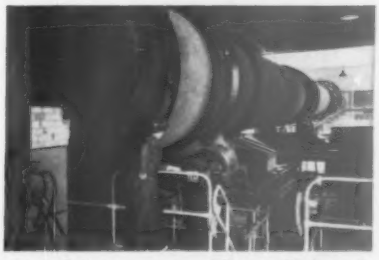
Kiln-gas, burning zone, mill air, dried material temperatures . . . Foxboro Dynalog Electronic Recorders chart them all at U. S. Steel Corporation's Universal Atlas Cement Division at Universal, Pa.

And in seven years of continuous, 24-hour-a-day, 7-day-a-week operation, Foxboro Dynalog Recorders have required no maintenance except occasional vacuum-tube replacement.

Low-maintenance is designed right into the Dynalog. There are no slidewires or other moving parts as found in conventional electronic recorders. Instead, a variable, radio-type capacitor with silent magnetic drive, gives stepless, continuous balancing; smoother, faster response without waste motion or wear!

For sustained high accuracy, and freedom of maintenance, investigate Foxboro Dynalog Recorders. They can be used for any electrical measurement . . . resistance, voltage, capacity.

Write for Bulletin 20-10 — it gives all the details. The Foxboro Company, 835 Neponset Ave., Foxboro, Massachusetts.



One of the two rotary kilns at Universal Atlas Cement Division, as seen from the firing platform. Each kiln is 360′ long, 11′ in diameter.

*Reg. U. S. Pat. Off.*

FOXBORO
REG. U.S. PAT. OFF.

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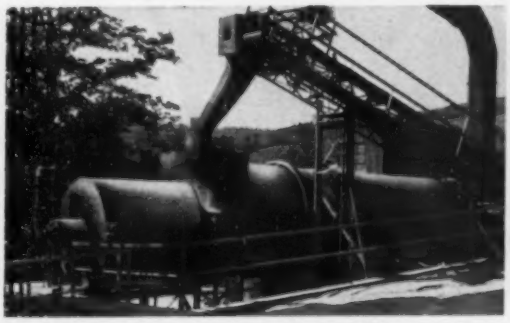
# KILNS • COOLERS • DRYERS

**researched, designed, and built specifically for your needs and product . . . by experienced McDermott engineers**



This McDermott Rotary Dryer installation fulfilled specific requirements of the North American Refractories Little Gap plant. Economical dependable performance results from McDermott's sound engineering practices and long experience.

Staggered cup-shaped lifters assure even distribution of product. RESULT: greatly increased capacity and efficiency.

Write for brochure, estimates, or recommendations . . . no obligation.

McDermott
BROS. CO., INC.

ALLENTOWN, PENNSYLVANIA — HE 3-3231

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# LIQUIDATING

1—Allis Chalmers SS rotary dryer, 6' x 50', complete with drive, motor, fans and blowers.

2—Louisville SS rotary dryers, 8' x 50', complete with drives, motors, fans, blowers, etc.

1—Traylor 11' x 155' rotary kiln, 2 tires, welded ⅞" shell, complete with drive and motor

1—Louisville rotary steam tube dryer, 8' x 45'

1—Rotary dryer 7' x 60', 2 tires, ½" shell, complete with drive, motor, blowers and all auxiliary equipment

1—Rotary 6' x 64', 2 tires, ½" shell, complete with drive, motor, blowers and all auxiliary equipment

1—Rotary dryer 6' x 56', 2 tires, ½" shell, complete with drive, motor, blowers and all auxiliary equipment

1—Rotary dryer 6' x 50', 2 tires, ½" shell, complete with drive, motor, blowers and all auxiliary equipment

1—Rotary dryer 6' x 35', 2 tires, ½" shell, complete with drive, motor, blowers and all auxiliary equipment

1—Rotary dryer 4' x 20', 2 tires, ½" shell, complete with drive, motor, blowers and all auxiliary equipment

10—Pacific vertical feed water reciprocating pumps, 10 GPM to 340 GPM, 80' head to 175' head, complete with motors

1—Dorr Type DSFR—2 classifier, 3' x 20'6" x 2½" slope

1—Hardinge pilot size ball mill, 24" x 8", complete

1—Patterson rod mill, 4' x 11'6"

**R. GELB & SONS, INC.**

U.S. HIGHWAY 22, UNION, N. J., Phone MUrdock 6-4900

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*(Continued from page 258)*

## Taylor named chief engineer

RICHARD R. TAYLOR has been named chief engineer of Fairmont Machinery Co., Fairmont, W. Va., succeeding M. A. Baret who had been appointed engineering assistant to the president. Mr. Taylor comes to Fairmont from the Barber-Greene Co., Aurora, Ill., and Link-Belt Co., Chicago, where he was employed in sales engineering on coal preparation and material handling equipment.

## Sales manager named at Patterson

RICHARD R. HEDDLESTON has rejoined The Patterson Foundry and Machine Co. as sales manager. His appointment became effective January 1.

At the time of his departure in 1953, Mr. Heddleston had been a sales executive for Patterson for more than 20 years. Since then he has been active with other processing firms serving the chemical and related industries.

## Porter Mouldings becomes Coldform

THE NAME OF THE MOULDINGS DIV. of H. K. Porter Co., Inc., has been changed to Coldform Div. according to C. L. Holbert, Porter president. "The purpose of this change," Holbert said, "is to provide the division with a name that more adequately describes its services to modern industry." The division serves the automotive, electronics and construction industries from plants located at Detroit, Mich., and Frankfort, Ky.

*(Continued on page 262)*

# BLASTHOLER

## ROTARY DRILL CUTS COSTS— SPEEDS BLASTING

**BLASTHOLER**

**ABOVE:** Track and tire-mounted BLASTHOLERS drilling 25′ blast holes without adding steel in a hard limestone quarry.

This self-propelled rotary drill can really start your production on the up-swing — save you money, too! 2 to 5 times faster than other cumbersome equipment, the BLASTHOLER requires only one operator, carries own air for cleaning hole. Standard BLASTHOLER drills 20′ holes 3″ in diameter without adding steel. Optional equipment gives you depths to 50′. BLASTHOLER mounts on tracks or dual pneumatic tires to meet your terrain requirements. Cut costs — speed blasting! See the BLASTHOLER today!

**BLASTHOLER DEALERS**

The W. W. Williams Co.
Columbus, Ohio

Reid-Holcomb Co., Inc.
Indianapolis, Ind.

Watson Equipment Co., Inc.
Pittsburgh, Pa.

Ray C. Call Co., Inc.
South Charleston, W. Va.

Illinois Road Equipment Co.
Springfield, Ill.

Williams Tractor Co.
Louisville, Ky.

Hi-Way Machinery Co.
Dallas, Texas

Bublitz Machinery Co.
North Kansas City, Mo.

James W. Bell Co., Inc.
Cedar Rapids, Iowa

Anderson Equipment Co., Inc.
Omaha, Neb.

Wylie-Stewart Co., Inc.
Oklahoma City, Okla.

Wisconsin Drilling & Equipment Co., Inc.
Madison, Wis.

Contractors Machinery Co.
San Antonio, Texas

DRILLING ACCESSORY AND MANUFACTURING COMPANY, INC.
2006 South Industrial Boulevard
Dallas, Texas

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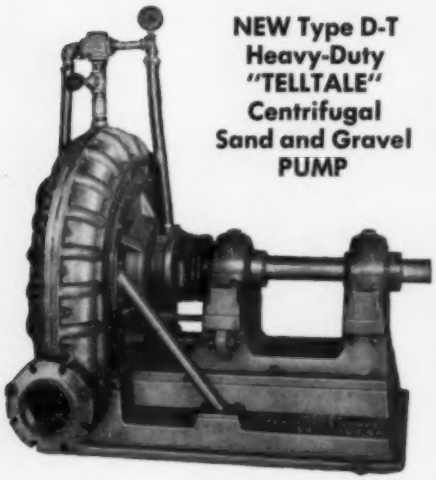
## LOOKING FOR A BETTER SAND AND GRAVEL PUMP?



**NEW Type D-T Heavy-Duty "TELLTALE" Centrifugal Sand and Gravel PUMP**

Have a look at the Type D-T Heavy Duty "Telltale" Pump. Its production is the talk of the industry wherever it has been put to work. Likewise, what it can take under what would be heavy overloading for an ordinary pump.

**AS LOW IN DOWNTIME AS IT IS HIGH IN PRODUCTION**

**"Telltale" is the only pump that warns when it's time to reline. Air sucked through periphery ports causes pump to lose its prime. Pumping stops. Water leaking through the ports signals that the shell liner and the surrounding belt of packing have worn through.**

Available with either tough semi-steel or best-in-the-long-run Ni-Hard wearing parts in 4", 6", 8", 6 x 8" suction and 8 x 10" suction. Now available also in either alloy, 45 and 90° extra-heavy long-radius flanged elbows. Write for Type D-T Heavy-Duty folder and prices.

**PEKOR IRON WORKS, INC.**

*ESTABLISHED 1892*

LOCK DRAWER 909 *FAIRFAX 2-4020* COLUMBUS, GEORGIA

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**FOR THE CONTROL OF ROCK, ORES, ETC. TO CRUSHERS, CONVEYORS, ETC.**

## ROSS CHAIN FEEDERS
## ROSS DROP-BAR GRIZZLY FEEDERS

**ROSS SCREEN & FEEDER CO.**
100 Quimby Street
WESTFIELD, N. J.

**ROSS ENGINEERS LTD.**
11 Walpole Road,
SURBITON, SURREY, ENGLAND

CANADIAN LICENSEE: DORR-OLIVER-LONG LTD., ORILLA, ONT.

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## DID YOU BENEFIT FROM SOMETHING YOU READ IN "ROCK PRODUCTS"

Elsewhere in this issue is a special form to make it easy to subscribe for a friend or employee. Why not pass along the form to people you think should be reading ROCK PRODUCTS every month.




*(Continued from page 260)*

### Warren appointed sales representative

ROGER K. WARREN has been appointed district sales representative by Flygt Corp., and will direct the sale of Flygt electric submersible pumps in lower Michigan, Indiana, Kentucky, Ohio and western New York. Headquarters will be Columbus, Ohio. Mr. Warren comes to Flygt highly experienced in the construction industry from past association with Joy Mfg. Co. and State Equipment Co., of Albany, N.Y., where he held positions as sales engineer.

### Pioneer names sales representative

WAYNE L. NIEDENS has been appointed sales representative by the Pioneer Rubber Co. of Willard, Ohio, for the company's Texas subsidiary. He will be headquartered in New Orleans, La. Mr. Niedens received his college training at Union College, Lincoln, Neb., and Tulane University, New Orleans. He was formerly associated with Western Waterproofing Co.

### Chrome brick lines kiln

PORTER REFRACTORIES DIV. has recently shipped a complete basic refractory brick lining for a rotary kiln in a cement plant from Pascagoula, Miss. "Kilmag" burned magnesite chrome brick will line the entire hot zone section of a dry process kiln for a plant which manufactures 2,700,000 barrels of cement per year. This is probably the first application of this type of brick for a portland cement kiln.

### Hinkley elected president

J. WILLIAM HINKLEY has been elected president of Research-Cottrell, Inc., Bound Brook, N.J., following the resignation due to illness of James M. Knox. Mr. Knox has been elected vice chairman of the board of directors of Research-Cottrell.

Mr. Hinkley is also president of Research Corp., a foundation to provide means for scientific investigation. Research-Cottrell Inc. is a wholly owned subsidiary of the foundation.

**END**

# WHERE TO BUY

You may find just what you're looking for in the used equipment, employment, and professional advertisements below. See instructions for inquiries on bottom of coupon at end of this section.

## FOR SALE

Three 2'–4" T. Y. Traylor Gyratory Crushers and one 4' T. Y. Traylor Gyratory Crusher

PRICES ON REQUEST

**C. W. BLAKESLEE & SONS, INC.**
P. O. BOX 1809
NEW HAVEN, CONNECTICUT
Telephone UN 5-4135

## INVENTORY SALE

### Cranes—Hoes

Manitowoc 1600 Lift Crane, 50' Boom, Jib, Diesel power.

Lorain TL20 Truck Crane, 50' Boom, Ind. Boom, gas power.

Insley K-12 ½ yd. Hoe, long tracks, Chrysler gas.

Bantam M-49 Lift Crane, 40' Boom, GMC 6x6 Crane Carrier, outriggers—Perfect.

P&H 255A Shovel Attachment, ¾ yd.

Lorain TL20 Shovel Attachment, ½ yd.

### Truck Mixers

Jaeger 5 Yd. Continental engine, open end, new 1951; on I-H LF190 Tandem

Rex 3½ yd. Chrysler engine, flush tank; on I-H LF172, 5 speed—3 speed, 825 tires—Clean & priced right.

10 Mixers in stock—All Traded on New Rex Mixers.

### Crushing Equipment

Gruendler 2XB Hammermill—bare—good —cheap.

Universal TDS30 Portable Secondary Plant, 800 Series, 30" Twin Dual, 4x12 —2½ D. screen, 30" conveyors, & Cat Power.

120 S. Pierpont WO 4-6706
**EIGHMY EQUIPMENT COMPANY**
ROCKFORD, ILLINOIS

## YOU CAN SAVE MONEY AND MAKE A PROFIT WITH THIS EQUIPMENT

### QUARRY EQUIPMENT

Cedarapids 2236 Primary Jaw Crushing plant.
Cedarapids Jr. tandem crushing plant, 1036 jaw.
Cedarapids Portable Screening Unit.
Universal 2436 Jaw Crusher. Reconditioned.
Austin-Western 1536 Jaw Crusher. Reconditioned.
Cedarapids 1036 Jaw Crusher. Reconditioned.
Cedarapids 1216 Twin Jaw Crusher. Reconditioned.
2—Cedarapids 4033 hammermills rebuilt.
Cedarapids 2033 hammermill. Slightly used.
Cedarapids 2033 Hammermill. Rebuilt.
Cedarapids 4' x 14' 2-deck screen.
2—Cedarapids 4'x12', 2-deck screens.
Robins 4' x 9' triple deck screen.
Telsmith 3' x 8', 2-deck inclined screen.
Aggregates 4' x 14', 3-deck inclined screen.
54" dia. x 23' lg. revolving screen.
4' x 6'6" heavy duty reciprocating feeder.
2—Cedarapids 42" x 10' apron feeders.
Cedarapids 30-S, 3-compartment charging hopper, apron feeder, bucket elevator. New.
Eagle 36"x20' double log washer. Good.
McLanahan & Stone 8'x30' double log washer.
Smitheo 10-Yd. Portable Charging Bin.
8' x 12', 8' x 18', 13' x 23' bins in stock
18", 24", 30", 36" conveyors & belting
Smithco 24"x75', 7½ H.P. Belt Conveyor.
Smithco 30"x34', 7½ H.P. Belt Conveyor.
Barber Greene Model 848 Asphalt Plant.

### SHOVELS AND CRANES

Lorain L-26, ¾-yd. diesel dragline. Excellent.
Lorain L-41, ¾-yd. Diesel shovel
Lima 34 Paymaster ⅝-yd. diesel shovel. Good.
Unit 1020 ⅝-yd. diesel powered shovel.
Koehring 304, ⅜-yd. diesel shovel-backhoe
Insley K-12, ½-yd. gas backhoe
Bucyrus-Erie 10B, ⅜-yd. Gas Shovel.
Byers 83-CC, 20-ton truck crane.
Lorain MC-414, 20-ton Moto-Crane.
Link Belt HC-90, 25-ton truck crane.
Michigan TLDT-20, 10-ton truck crane.
Lorain MC-454, 15-ton Moto-crane.
Lorain TL-20, 10-ton Moto-crane.

### TRUCKS, TRACTORS, SCRAPERS

2—Euclid 13-yd. bottom dumps. Good.
2—Euclid 27FD, 15-ton rear dumps.
1—Euclid tractor with 3200 gallon water tank.
1—Caterpillar D-8 with cable Angledozer.
1—Caterpillar D-8 with Heil scraper.
1—Caterpillar D-8 with push block
1—Caterpillar D-4 tractor only.
1—Euclid TC-12, twin engine tractor
1—International TD-24 with cable angledozer.
1—Letourneau Super C Tournadozer. Excellent.
1—Allis-Chalmers HD-9-G Tractor with loader.
2—Allis Chalmers TS-360, 15-yd. scrapers.
2—Euclid TS-34, 24-yd. twin engine scrapers
3—Euclid 18-yd. overhung engine scrapers.
1—Euclid 15½-yd. six wheel scraper.
3—Euclid 7-yd. overhung engine scrapers.

Inquire for list of drilling equipment, air compressors, diesel power units, generators, shovel & backhoe attachments.

**L. B. SMITH, INC.**
Camp Hill, Pa.
Phone Harrisburg REgent 7-3431

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| 2,000,000 ft. | 2" | 3,50# to the foot |
| 1,000,000 ft. | 3" | 7,70# |
| 1,000,000 ft. | 4" | 10,98# |
| 500,000 ft. | 6" | 19,80# |
| 200,000 ft. | 8⅝" | 28# |
| 400,000 ft. | 10¾" | 35# |
| 75,000 ft. | 12¾" | 40# |
| 10,000 ft. | 16" | 42# |

All No. 1 Grade plain end and cleaned.

**INDIANA-OHIO PIPE CO.**
P. O. Box 5412 Shepard Station
Columbus 19, Ohio Phone C.L. 3-5527

## (New) GENUINE INGERSOL RAND ROCK BITS—*save up to 80%*

Types 162 Thread.
Side Hole & Center Hole.
Sizes 1½", 1⅝, 1¾, 1⅞, 2, 2⅛, 2¼, 2⅜, 2½.
Lots of 50 or more 20¢ each up to 2"
Lots of 50 or more 25¢ each up to 2½"

Additional discount 10% on 500 or more, 20% on 1000 or more.
Exceptional value. Stock up now while supply lasts.
**WENZEL MACHY. CO. 565 S. 10th**
Kansas City, Kans. Mayfair 11710

**PLANTS:** CR 1036, 1524, 1824 & 2236, Univ 880 Jr Port. Crushing. Noble CA354, 506 Batch & 3000# 4000# Cummer, BG842 Asphalt.
**SPECIALS:** Iron Culvert 8'x40', 270' Crane Runway, 80'x220' Steel Building. 20, 30, 60 ton Bridge & Browning WB2 Wagon Cranes
**CRUSHERS:** 816, 1028, 1036, 1536, 1836, 2036, 2436, 2442, 3042, 3642, 4042 **JAW.** 9 & 12K Gates, AC322R, 636, 848R. 16" Traylor, 13B, 25B & 28" Telsmith. 25½, 12" & 37½ KVS **GYR.** 3' Symons std. & S/H. 1836, 1842 sgl. 3018, 4024, 5424 dbl **ROLL.**
**FEEDERS:** 3x8', 3x10' & 3x14'. **LOADERS**
**DRYERS:** 3x15, 4x20, 4x30, 5x16, 5x24, 8x70
**MILLS:** 5047, 5057 Roll. Dixie 2424, 3630, 3650, Gruendler 1230, Williams #4, #5, 230 Hammer
**WASHERS:** Eagle 7x20, Hardinge 4x8', Yuba 7x35. Link Belt 24"x26', 30"x24' twin Screw.
**SHOVELS:** NW6, 25, 80D. Link Belt LS50, B5, LS85, LS90, Marion 93M, 111M, 492, BW54B, 9W, 170B. P&H 655B. Lorain L80, 820. Koehring 304, 605, 1005. Lima 34, 604, 1291.
**CONVEYORS:** 24x100, 200, 360', 36x645, 42x1250.
**MID-CONTINENT EQUIPMENT CO. INC.**
8321 Gannon St. Louis 32, Mo. Wydown 1-2626

ROCK WHERE TO BUY

## LIQUIDATION

### CRUSHING & GRINDING PLANT

### MANCHESTER, CONN.

2—Symons 3' shorthead cone crushers with spare bowl
2—Hardinge 7' x 36" conical pebble mills
2—Buchanan 13" x 24" jaw crushers, 50 HP with spare parts
19—Abbe Eng. 6' x 8' pebble mills, 30 HP
1—Allis-Chalmers 6' x 18' pebble-tube mill
1—Christie 4'6" x 45' long rotary dryer
5—Bucket elevators; up to 40' high

**LOW PRICES FOR QUICK REMOVAL**

**SEND FOR CIRCULAR!**

---

**MILLS**

BALL, Kennedy 7' x 9', 150 HP
CONICAL BALL, Hardinge 10' x 48"
CONICAL BALL, Hardinge 4' x 16"
BALL-TUBE, Allis 5' x 22', 150 HP

**DRYERS & KILNS**

11' x 10' x 175' Vulcan Kiln, 13/16" shell
11' x 155' Traylor Kiln, ¾" shell
10' x 80' Dryers, ¾" shell
8' x 125' Kiln—⅜" shell
8' x 70' Ruggles Coles, ⅜" shell
8' x 40' Stearns-Rogers dryer, ⅜" shell
7'6" x 100' Kiln, ½" shell
7'6" x 60' Kiln, ½" welded shell
6' x 7' x 100' Kiln, ⅞" shell
7' x 50' Allis-Chalmers dryer, ⅜" shell
6' x 50', Louisville dryer

**CRUSHERS—PULVERIZERS**

GYRATORY, Kennedy #49, 12½", 100 HP
JAW, 36" x 15", 20" x 6", 18" x 9"
BABCOCK & WILCOX Type E32, 75 HP
RAYMOND #5057 hi-side mill
HAMMERMILLS, PENNA. C3-30, 60 HP
HAMMERMILL, PENNA. #5060 UNUSED
ROBINSON 36" Saw-tooth, 15 HP

**PERRY EQUIPMENT CORPORATION**

1418 N. Sixth St. Phila. 22, Pa.

POplar 3-3505

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## TOP BUYS FROM MACHINERY CENTER

12½' Conveyco Sand Wheels

**CONVEYORS**
1—14" x 100' Belt, steel frame, Exc.
1—18" x 178' Belt, steel frame, 7½ HP.
3—6" x 43' Carpco, BC-6B, sliding belt.
2—6" x 33' Carpco, BC-6B, sliding belt.
1—60" x 150', steel framework, 100 HP. gearmotor
1—42" x 1250', Link Belt, 2—100 HP. gearmotors
1—36" x 645' Link Belt, 100 HP. gearmotor
1—42" x 870' Link Belt Trailing Type and Conveyco mobile stacker, 100 HP. gearmotor 440 V.

**CRUSHER, JAW**
1—10 x 20 Rogers Iron Works, with drive
1—10x21 Telsmith with motor & drive
1—10 x 30 Pacific, Type KH, motor & drive
1—2½" x 4" Braun chipmunk, 2 HP. 220/440 V
2—2¼" x 3 Braun chipmunk, ¾ HP. Motor
1—15" x 36" Universal, 50 HP. 220/440 V.

**CRUSHER, GYRATORY & CONE**
1—2'4" Traylor TY, Less Motor
1—4' Symons, Shorthead, 150 HP. motor
2—5½' Symons, standard, 200 HP. motor

**CRUSHING PLANTS**
1—10" x 36" Pioneer Model 40 V, UD 24 Diesel Power.
1—15" x 24" Cedar Rapids Portable, Case Gas Power
1—10" x 16" Cedar Rapids Pitmaster, Complete UD 14 Diesel

**DRYER**
1—36" x 13' Hardinge Ruggles Cole Complete excellent. Located Clearwater, South Carolina

**FEEDERS**
1—36" x 8'4" Link Belt, Apron, 3 HP. motor
1—20" x 6' Schaffer Poidometer Constant weight
1—36" x 72" Jeffrey Traylor Grizzly Feeder, 440 V.

**HOPPER**
Conveyco truck dump station, Hopper 15' x 15' x 10' with tilting Grizzly, 4' x 8' plate feeder, all complete with Hydraulic cylinders, gearmotor drives.

**KILN**
1—48" x 30' Hardinge Ruggles Cole, Complete Excellent. Located Clearwater, South Carolina

**MILLS, BALL & ROD**
1—4' x 10' Marcy Rod Mill, 75 HP. 440 V.
1—3' x 8' Hendy Rod Mill, 30 HP. 440 V.
1—5' x 10' Marcy Ball Mill, 100 HP. 440 V.

**SAND WHEELS**
4—12½' x 4' Conveyco, duplex, steel tank, 2—20 HP Westinghouse gearmotor

**SEPARATORS**
1—Type D-1A Exolon, 3 unit Vertical Roll Type
6—Type MI-418 Carpco High intensity
2—Type HT-460 Carpco, High Tension

**SCREEN**
1—9' dia. x 54½' Yuba Trommel, 100 HP. West. 440 V.
4—4' x 12' Tyler Ty-Rock, F-600, 10 HP. 220/440 V.
1—4' x 8' Symons Rod Deck Screen, 7½ HP. 220/440 V.
1—4' x 8' Tyler Hummer, Type 38
2—6' x 12' Allis Chalmers lowhead, 10 HP. 220/440 V.
6—4' x 5' Tyler "Hummer", type 50 Head

**SHOVELS**
1—Model 111 M Marion shovel & Dragline, Diesel Electric 4 yd., 100' Dragline Boom
1—Model 170 B Bucyrus Erie Electric shovel Esco Bucket, 2400/4160 Y, Rotoclone Air Filter system, Complete with rubber cable, and Junction Box.

**WEIGHTOMETER**
1—36" Merrick Model E with Electric Recorder
1—12" Merrick Type S. Excellent Condition
1—24" Merrick Model E.

**WHEELS, DEWATERING**
4—12'—6" x 4' Conveyco Sand Wheels, Complete with Tank, w/20 HP. West. gearmotors, Exc.

**GET OUR LIST of EQUIPMENT**

**AMERICA'S LARGEST MINING EQUIPMENT LIQUIDATORS**

## MACHINERY CENTER INC.

1201 South 6th West PO Box 964 HU 4-7601 Salt Lake City 10, Utah

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## SPECIALS

#1, #0 Raymond Mills

6'-5"x100' & 6'x120' Kilns

Complete Lime Hydrating plants.

**CRUSHERS**

1—48" x 60", 42" x 40", 30" x 36", 24" x 36", 18" x 36", 15" x 30", 12" x 24" Jaw Crushers.

2—42" x 16" Allis-Chalmers Crushing Rolls, rebuilt. 36" x 16 rebuilt Sturtevant rolls.

1—6", 10", 16", 20" McCully Superior Gyratory Crushers.

No. 3 up to No. 12 Gyratory Crushers.

**BALL & TUBE MILLS**

5'x22', 6'x22', 7'x24'

**DRYERS**

8½'x65' & 8'x60'

**W. P. HEINEKEN, INC.**

50 Broad St., N.Y. Tel. Wh. 4-4236

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## CRUSHERS

### PRICED RIGHT

Gyratory—24" Allis Chalmers 8-K, with spare shaft and mandrel

Rolls—36" diameter x 16" face Superior roll crushers (2) with separate motor on each roll.

Rolls—30" diameter x 16" face Traylor roll crusher.

**L. J. LAND, INC.**

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| Box 689 | Box 756 |
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## MOTORS AND GENERATORS

All sizes, new and rebuilt. Starters, accessories, pulleys and repair parts. Gear motors, Falk Shaft mounted Speed Reducers, couplings and V-belt drives.

EXPERT REPAIR SERVICE

NUSSBAUM ELECTRIC COMPANY

220 E. Douglas Ave., Fort Wayne, Ind.

---

**DEPENDABLE USED MACHINES**

**Shovel front for Lorain 77B 1½ yd. w/PM shovel bucket**

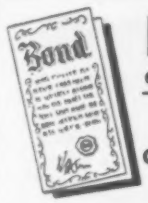
| | | |
|---|---|---|
| NW #105 crane | Link Belt shovel LS85 | Lorain TL25K ¾ yd. dragline |
| Cat. D-7 angle dozer | 614 ½ yd. Unit backhoe | Eagle 24"x18' single screw |
| 200 DTM 55-24 Hopto | Lima 84 Paymaster backhoe | 360 Hopto on Army carrier |
| P&H 150 ½ yd. dragline | Bay City 25 ½ yd. dragline | Int. TD9 tractor w/B-E dozer |
| Lorain 20 ton truck crane | Jeep trencher w/dozer blade | Terratrac 500 w/hoe & trailer |

**This equipment rebuilt in our modern plant by expert mechanics. Come see it!**

10002 Southwest Highway TRACTOR & EQUIPMENT CO. Oak Lawn, Illinois

# BONDED QUALITY BARGAINS

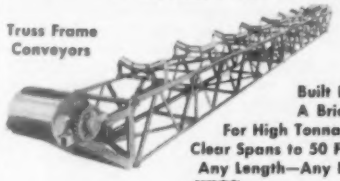
**CURRENT MODELS - IMMEDIATE SHIPMENT FROM OUR FACTORY - WRITE, WIRE OR PHONE FOR FREE CATALOG AND PRICES**




## BONDED TROUGHING IDLER CONVEYOR BARGAINS

8" Jr. I Beam Frame Conveyors

Truss Frame Conveyors



**Built Like A Bridge For High Tonnages Clear Spans to 50 Ft.— Any Length—Any Belt Width**

Complete Pre-Fab sections of 8" Jones & Laughlin Jr. I Beam Frame Conveyors quickly and easily joined together on the job. These beams are rolled with .20% Copper Content. Atmospheric exposure tests disclose that Junior Beams with .20% Copper have as much as four times the resistance to corrosion as non-copper steels. Braced with structural angle, welded to frame for maximum rigidity. Equipped with 5" roll diameter idlers and return rolls, 20" diameter head pulley and 16" diameter tail pulley, mounted on 2 1/16" or 2 7/16" diameter shaft.

We take our loss on our stock of short length belting. You can save as much as 50% on BONDED CONVEYOR SPECIALS, with conveyor belting in two pieces. Belt is new 4-ply, 28 oz. duck, 1/8" top rubber cover x 1/32" bottom cover Major grade belt and is Fresh Stock made by leading manufacturers. **WRITE FOR BULLETIN #1138.**

Bonded troughing idler conveyors also available in Truss Frame Construction. **WRITE FOR BULLETIN #1189 AND PRICES.**

### JR. I BEAM CONVEYOR PRICES

**Conveyor Prices Include Belting**

| Belt Width | Conveyor Length | List Price | Sale Price | Add or Deduct Per Foot |
|---|---|---|---|---|
| 14" | 25' | $1425 | $ 753 | |
| 14" | 50' | 2266 | 1182 | $17.18 |
| 14" | 85' | 3445 | 1783 | |
| 16" | 20' | 1287 | 686 | |
| 16" | 45' | 2180 | 1148 | |
| 16" | 60' | 2715 | 1416 | 18.40 |
| 16" | 90' | 3786 | 1969 | |
| 16" | 150' | 5928 | 3072 | |
| 18" | 25' | 1507 | 813 | |
| 18" | 45' | 2261 | 1206 | |
| 18" | 70' | 3205 | 1696 | |
| 18" | 85' | 3771 | 1991 | 19.62 |
| 18" | 100' | 4337 | 2285 | |
| 18" | 130' | 5469 | 2873 | |
| 18" | 200' | 8111 | 4247 | |
| 20" | 25' | 1547 | 852 | |
| 20" | 60' | 2940 | 1579 | |
| 20" | 75' | 3536 | 1891 | 20.78 |
| 20" | 90' | 4133 | 2202 | |
| 24" | 25' | 1622 | 916 | |
| 24" | 45' | 2479 | 1361 | |
| 24" | 70' | 3550 | 1916 | |
| 24" | 100' | 4835 | 2583 | 22.22 |
| 24" | 120' | 5692 | 3026 | |
| 24" | 150' | 6977 | 3693 | |
| 24" | 200' | 9119 | 4804 | |
| 30" | 50' | 2969 | 1649 | |
| 30" | 70' | 3948 | 2154 | |
| 30" | 90' | 4928 | 2659 | 25.25 |
| 30" | 140' | 7376 | 3922 | |
| 36" | 25' | 1854 | 1140 | |
| 36" | 45' | 2915 | 1711 | |
| 36" | 60' | 3711 | 2138 | 28.51 |
| 36" | 100' | 5832 | 3278 | |

Other lengths and belt widths priced upon application. **BONDED 30° DEEP TRUSS CONVEYORS** also built in heavy duty Portable Models. Available with Screen and Feeder and with mast or mastless type undercarriage and hydraulic powered mechanism. Lengths to 60 feet and belt widths through 30 inches. Equipped with Tow Hitch for easy moving from one job-site to another.

**PRICED FROM $2365.**

# FREE! FREE!

## For A Limited Time Only!

## You Must Say You Saw This Ad And Then

**With every belting purchase of $300.00 or over, you will receive ABSOLUTELY FREE your CHOICE of ONE PAIR OF CARRYING or RETURN GUIDE IDLERS or ONE TROUGHING IDLER of the corresponding belt width as described below.**

**MAJOR BRAND: 12# to 15# Average Friction Pull. 800# to 1000# Average Cover Tensile.** Heavy duty 4-ply, 28 oz. duck, 1/8" top rubber cover x 1/32" bottom rubber cover belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. Used in moving boxes, bags, coal, sand, gravel, crushed stone, refined sugar, salt, coke, earth and similar materials when abrasion is not too severe.

| Width | Ply | List Price Per Ft. | Sale Price Domestic Per Ft. |
|---|---|---|---|
| 14" | 4 | $3.78 | $2.94 |
| 16" | 4 | 4.24 | 3.09 |
| 18" | 4 | 4.69 | 3.42 |
| 20" | 4 | 5.17 | 3.95 |
| 24" | 4 | 6.08 | 4.43 |
| 30" | 4 | 7.47 | 5.42 |
| 36" | 4 | 8.85 | 6.43 |

**Major Bee Brand: 16# to 19# Average Friction Pull. 2400# to 3000# Average Cover Tensile, Skim Coat Between Plies.**

A high grade of heavy duty 4 and 5-ply 28-oz. duck 1/8" top rubber cover x 1/32" bottom rubber cover. These belts are for more severe service, high tonnages and abrasion resistance. For hauling stone, mineral ores, concrete, cement, coal and other similar materials, both wet and dry. Belts have molded rubber edges.

**You Pay The Sale Price**

| Width | Ply | List Price Per Ft. | Domestic Sale Price Per Ft. | Imported Sale Price Per Ft. |
|---|---|---|---|---|
| 14" | 4 | $ 4.48 | $3.18 | $2.98 |
| 16" | 4 | 5.04 | 3.60 | 3.14 |
| 18" | 4 | 5.61 | 3.98 | 3.47 |
| 20" | 4 | 6.14 | 4.54 | 3.99 |
| 24" | 4 | 7.22 | 5.14 | 4.50 |
| 30" | 4 | 8.87 | 6.31 | 5.58 |
| 36" | 4 | 10.49 | 7.64 | 6.50 |
| 24" | 5 | 8.47 | 6.01 | 5.25 |

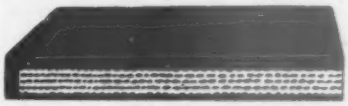
**Major B-X Smooth Surface. 20# to 24# Average Friction Pull. 3400# to 4000# Average Cover Tensile.** Skim coat between plies. 28 oz. duck. A heavier duty belt with 1/8" top cover x 1/32" bottom cover. For the higher abrasion resistance applications and handling of materials where more strength is required to give greater belt life.

**You Pay The Sale Price**

| Width | Ply | List Price Per Ft. | Domestic Sale Price Per Ft. | Imported Sale Price Per Ft. |
|---|---|---|---|---|
| 16" | 4 | $ 5.70 | $3.93 | $3.31 |
| 18" | 4 | 6.34 | 4.37 | 3.64 |
| 20" | 4 | 6.95 | 4.98 | 4.02 |
| 24" | 4 | 8.18 | 5.63 | 4.71 |
| 30" | 4 | 10.09 | 6.92 | 5.80 |
| 36" | 4 | 11.83 | 8.16 | 6.84 |

## TESTED CONVEYOR BELTING*

**WE PAY FREIGHT ON 200 POUNDS OR OVER PLUS AN ADDITIONAL 10% SAVINGS FROM SALE PRICE FOR FULL ROLLS 500 TO 650 FEET.**



**Major C-Bee Brand, Smooth Surface, 15# to 17# Average Friction Pull. 1600# to 2400# Average Cover Tensile.** Skim coat between plies. Heavy duty belts for more severe service, high tonnages and abrasion resistance. 4 ply, 28 oz. duck. For handling stone, mineral ores, concrete, cement, coal and other similar materials both wet and dry. Belts have molded rubber edges.

| Width | Top Cover | Bottom Cover | List Price Per Ft. | Sale Price Imported Per Ft. |
|---|---|---|---|---|
| 14" | 1/8" | 1/32" | $ 4.35 | $2.96 |
| 16" | 1/8" | 1/32" | 4.92 | 3.12 |
| 18" | 1/8" | 1/32" | 5.45 | 3.44 |
| 20" | 1/8" | 1/32" | 5.97 | 3.97 |
| 24" | 1/8" | 1/32" | 7.03 | 4.46 |
| 30" | 1/8" | 1/32" | 8.62 | 5.56 |
| 36" | 1/8" | 1/32" | 10.20 | 6.45 |

**The Following Belts Are 5 Ply, 32 Oz. Duck:**

| | | | | |
|---|---|---|---|---|
| 24" | 1/8" | 1/32" | $ 9.17 | $5.33 |
| 30" | 1/8" | 1/32" | 11.27 | 6.59 |
| 36" | 1/8" | 1/32" | 15.23 | 8.45 |

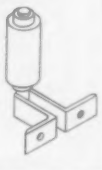
*** All belting is tested by the Engineering laboratory of one of the largest universities in the United States. It is guaranteed to meet or exceed listed specifications.**

Other widths, plies, duck weights and cover thickness available at low prices.

**WRITE FOR FREE SAMPLE & BULL. #1263**

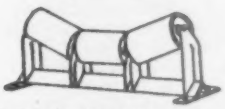
## CARRYING BELT AND RETURN BELT GUIDE IDLERS

**Carrying Belt Guide Idler $29.00 Per Pair**



**Return Belt Guide Idler $15.50 Per Pair**

## BONDED® IDLERS & RETURN ROLLS FOR UTMOST ECONOMY ON THE JOB



3-roll, 5" diameter Troughing Idlers for:

| | | | |
|---|---|---|---|
| 14" belt | $19.75 | 24" belt | $32.75 |
| 16" belt | 20.50 | 30" belt | 23.85 |
| 18" belt | 21.90 | 36" belt | 24.90 |
| 20" belt | 22.10 | 48" belt | 27.50 |

1-roll, 5" diameter Return Rolls for:

| | | | |
|---|---|---|---|
| 14" belt | $ 8.50 | 24" belt | $11.00 |
| 16" belt | 9.00 | 30" belt | 12.50 |
| 18" belt | 9.50 | 36" belt | 13.75 |
| 20" belt | 10.00 | 48" belt | 16.50 |

All steel. Interchangeable with other well-known makes. Furnished with replaceable prelubricated sealed ball bearings. Maintenance is negligible. **WRITE FOR BULLETIN #1138.**

# BONDED SCALE AND MACHINE COMPANY

**PHONE Days: Hickory 4-2186** — **WRITE FOR FREE CATALOG AND PRICES** — **PHONE Evenings: AX. 1-2213 or TEmple 7-4519**

**128 Bellevue** — **Mfrs. of Scales, Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers, Feeders and Bucket Elevators** — **COLUMBUS 7, OHIO**

ROCK **WHERE TO BUY**

**HEAVY EXCAVATION EQUIPMENT**
**DRAGLINES, SHOVELS, CRANES, DRILLS, TRUCKS**

15-W Bucyrus Erie Elec. Drag, 215', 12 yd.
450-W Bucyrus Erie Diesel Drag, 165' with extra 10, 12, 13 and 14 yd. buckets.
9-W Bucyrus Erie Elec. Drag, 165', 10 yd.
9-W Bucyrus Erie Diesel Drag, 165', 12 yd.
7-W Bucyrus Erie Diesel Drag, 140', 7 yd.
7400 Marion Diesel Drag, 175', 13 yd.
71-B B.E. Crane with 160' boom
625 Page Diesel Drag, 150', 10 yd.
621-S Page Diesel Drag, 125', 7 yd.
200-W Bucyrus Erie Diesel Drag, 125', 6 yd.
2400 Lima Elec. Drag, 130', 6 yd.
2400 Lima Diesel Drag, 130', 6 yd.
4500 Manitowoc Drag, 120', 5 yd.
120-B Bucyrus Erie Elec. Drag, 115', 5 yd.
111-M Marion Drag, 100', 4 yd.
1601 Lima, 4 yd. Shovel/Drag
3900, 3500 & 3000 Manitowoc Cranes
5560 Marion 26 Yd. Elec. Shovel
151-M Marion 7 Yd. Elec. Shovel
170-B Bucyrus Erie 6 yd. Elec. Shovel
1600 P & H 6 yd. Electric Shovels
4161 Marion 6 Yd. Elec. Shovel
2400 Lima 6 yd. Std. & H.L. Shovels
120-B Bucyrus Erie 4 Yd. Elec. Shovel
4500 Manitowoc 5 Yd. H.L. Shovel
1201 Lima 3½ Yd. Standard Shovel
111-M Marion Standard & H.L. Shovels
3500 Manitowoc Standard & H.L. Shovels
54-B Bucyrus Erie Standard & H.L. Shovels
Model T-650 REICHdrill Truck Mtd. Rotary and Down-The Hole
Ingersoll-Rand Truck Mtd. & Crawler Mtd. Drillmasters
McCarthy & Compton Coal Auger Drills
Euclid Trucks, Dozers, Attachments, etc.

**FRANK SWABB EQUIPMENT CO., INC.**
313 Hazleton Nat'l Bank Bldg.
Hazleton, Pa. GLadstone 5-3658

## "OUR 52nd YEAR"

600' - 9" Screw Conveyor Complete Ends, Hangers & Gearmotors.
6—Centrif. Discharge Encl. Elevators 6" Buckets, H-78 Chain.
24" x 95' Truss Frame Conveyor with Walkway, All New.
14" & 16" Used Rex Idlers.
20" Roller Bearing Trough Idlers.
30" to 48" Used Robins Idlers.
20" x 76" Roball Screen, Double Deck.
Niagara 4' x 14' Single Deck Screen.
Niagara 2½' x 12' Single Deck Screen.
New Universal Screens In Stock.
Jeffrey Traylor #4 Vibrating Feeder with controller.
New Holland Plate Feeder 24" x 60"
Iowa 25 Yd. Portable Crushing Plant.
Acme Jaw Crusher 14 x 26" Steel Frame.
Farrel Lab. Jaw Crusher 6" x 2".
New England Jaw Crusher 14" x 28".
Sturtevant #1 Rotary Crusher.
2—Lancaster "Iroquois" Pug Mills.
6' x 32' Heatherington Dryer, 50 H.P.
Bucket Elevators All Sizes Built To Order.
Belt Conveyors All Sizes Built To Order.
Largest Stock Reducers on East Coast.
Motors Up To 50 H.P.

**G. A. UNVERZAGT & SONS INC.**
136 Coit St. Irvington 11, N.J.
Essex 3-8105

# LIQUIDATION

**ALPHA PORTLAND CEMENT CO.**
**MANHEIM, W. VA.**

6—Vulcan 6'6"x60'x½" Rotary Kilns
1—Mosser 4'x47'x⅝" Rotary Dryer
1—Traylor 8'x11' Steel Lined Ball Mill
2—Beth. Fdy. 7'x24' Compeb Mills
3—Allis-Chalmers 6K; 8K Gyratorys
1—Barber Greene Model 82A Loader

**STOCK ITEMS**

Traylor 11'x155'x⅞" Rotary Kiln
3'x6' Horiz., 4'x9'x12" Vert. Puggers
Komarek-Greaves 27"x24" Briquet Presses
6'x25'; 6'x50' Louisville Rotary Dryers
7'x50'; 8'8"x70' Ruggles-Coles Dryers
Dixie #5060 Mogul Hammermill 500 HP
15"x8" to 24"x18" Jeffrey Hammermills
2—Raymond 5 Roll Low Side Mills
2—Raymond 4 Roll High Side Mills
Raymond 3 Roll #3036 Hi-Side Mill
Raymond #50, #40 Impact Mills
Jaw Crushers 48"x60", 36"x48", 20"x6"
6—Tyler Hummer Screens 4'x8', 4'x6'
4—Robinson Saw Tooth Crushers
535'—24" Troughing Belt Conveyor
Bucket Elevators 45' to 90' Centers

**BOILERS, COMPRESSORS, GENERATORS**

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**HEAT & POWER CO. INC.**
**ROCK PROD. EQPT. DIV.**
60 E. 42 St. New York 17, N.Y.
MU 7-5280

## BRILL BUYS

1—Williams "Titan" 5 roll High Side Mill, 100 HP TEFC motor, 8' dia. Separator, complete with piping, fan, cyclone, Pangborn dust collector & many spare parts.

**MILLS—CRUSHERS—PULVERIZERS**

1—Traylor Compeb Mill, 7' x 27'.
2—Hardinge 10' x 48", 8' x 36" Conical Ball Mills, motor driven.
1—Denver 3' x 5' Continuous Ball Mill.
1—Telsmith Red. Crusher no. 46, 50 HP.
2—Kennedy #6 Gyratory Crushers, 50 HP.
5—Jaw Crushers 12" x 18" to 36" x 48".
1—Penn. Non-Clog Swing Hammermill, size 5060, Hopper opening 47" x 60", cap. 200-275 tons per hour. UNUSED.
1—Penn. Super-Thor Hammermill, size SXT-13, 250 HP.

**AIR SEPARATORS—SCREENS**

1—18' dia. Raymond Double Whizzer Separator with 100 HP motor.
1—14' dia. Raymond Double Whizzer Separator with 60 HP motor.
1—10' dia. Raymond Single Whizzer Separator.
1—Link Belt 6' x 14' double deck Vibrating Screen.
1—Tyler Hummer Screen 4' x 10'.

**CONVEYORS**

1—Fuller-Kinyon Conveying System, type H257, 100 HP.
2—Fuller-Kinyon Conveying Systems, type 10-B-No. R, 75 HP.

WIRE PHONE WRITE

*Your Inquiries Solicited—Send for Circulars*

**BRILL EQUIPMENT COMPANY**
35-57 Jabez Street, Newark 5, N. J.
Tel: Market 3-7420

BATCHING PLANT: One 150 cu. yd. cement transit mix Bin with Concentric aggregate cement batcher, 5 cu. yd. capacity, weight indicators, totally enclosed bucket type cement elevator, 10" x 34' screw conveyor with undertrack, 520 bbl. cement silo, 638 bbl. ground storage silo, air compressor. A complete batching plant, used on one job.
FEEDER: One heavy duty Vibrator Feeder, Jeffrey-Traylor, 6'x7' with #5 DT power units and with Jeffrey-Traylor 6'x3½' heavy duty Grizzlies with #5 DT vibrator.
ROTARY DRYER: One 3' x 34', ½" shell, complete with 7½ H.P. gearhead motor, exhaust fan, etc.
KILN: One Rotary Kiln, 4½'x40' with rotoclone, 7½ H.P. motor, 3 H.P. motor, speed reducer, classifier, kiln burner, etc.
JAW CRUSHER: One 40 x 42" Allis Chalmers with 150 H.P. slip ring motor and controls, V-belt drive, with or without one heavy duty Apron Feeder size 42" x 14'3" with motor, speed reducer, push button control.
DREDGE: One 10" Diesel electric Dredge with 34' ladder, 200 yds. per hour capacity, excellent condition, reasonable.
PULVERIZER: Hardinge 6' x 36" Conical Mill, steel lined, complete with motor, V-belt drive, air heater, constant weight feeder, etc.
SINGLE DRUM HOISTS:
1—84" dia., 63" face, 2⅛" rope, 300 or 450 H.P.
1—84" dia., 102" face, 2" rope, 350 H.P.
1—86" dia., 80" face, 2" rope, 250 H.P.
1—84" dia., 63" face, 1⅝" rope, 150 H.P.
All the above built 1956.
DOUBLE DRUM HOIST:
1—Nordberg double clutched drum 10' x 10', 1½" rope, 1250 H.P., 1200 FPM.
All the above with post brakes, Lilly controls, 2200 volt motors and controls.
Other Hoists 100 to 1500 H.P. for shaft or slope.

**WE BUY AND SELL EQUIPMENT THROUGHOUT NORTH AND CENTRAL AMERICA**

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# PORTABLE ROCK CRUSHING PLANT

**Near St. Louis**

## LIMA 604 - BACKHOE ATTACHMENT FOR SALE

Primary Plant 3x10; apron feeder 36x40; Dixie Hammermill; UD-24 International Diesel Engine; 24" conveyor, 24' long for discharge to secondary machine.

Secondary Machine equipped with a 42x30 Gruendler Hammermill; 4x10 double deck Seco screen; D-13000 Caterpillar Diesel Engine; end conveyor 28" wide x 22' long; return conveyor 28" wide x 16' long. This is a closed circuit machine.

These 2 Units are all mounted on exceptionally good rubber and can be transported very easily. This plant is ready to pull into your pit and start crushing.

For Quick Sale, We Are Willing To Sacrifice Both Plants For $22,000.00.

Backhoe Attachment for Lima 604 Crane, Perfect Condition, Never Used .... $6,000.00

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MDL. C. TOURNAROCKER 22 TON
serial no. G.T. 2819-CT-K
6-71 GMC Power-Tournamatic Transmission
Tires 75% New—Mechanically very good
**THE NORTHERN OHIO STONE CO.**
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## AUCTION

### SAND and GRAVEL EQUIPMENT

**TIME: Saturday, May 21, 11 A.M.**

**LOCATION:Seven miles south of Norwalk, Ohio on Ridge Road. Phone: North Fairfield 2578 or 2250.**

**NOTICE: Our gravel deposits having been depleted we are selling at public auction, our complete line of crushing, screening, washing and loading equipment. The following equipment is all owned by Orlin R. Gilbert DBA HURON SAND & GRAVEL CO. and the general condition is very good, all pieces ready to go to work.**

**CRUSHING EQUIPMENT:**

1 AAA 20x36 Cedar Rapids Portable Primary Crushing Unit, GMC Diesel Power, Hopper with 3x8 webb feeder 30"x27' delivery belt, mounted on tandem rubber.
2 9x30 Good Roads Jaw Crushers, One mounted as a unit with a 3x6 single deck Plato Diester Vibrator screen; the other with a Bonded 2½x6 single deck Vibrator. Both units mounted on steel skids.
1 Jeffrey Swing Hammer Pulverizer, 24x18 with spare parts.

**SCREENING EQUIPMENT:**

1 Pioneer 4x10 3 deck vibrator screen.
1 Plato Diester 3x6 single deck vibrator screen.
1 Bonded 30x4 2 deck vibrator screen.
Quantity of new screen cloth for above vibrators.

**WASHING EQUIPMENT:**

1 Eagle Iron Works 22x15 single screw gravel washer with drives.
1 Eagle Iron Works 20x18 single screw sand classifier with drives.
1 Myers Centrifugal water pump Model 30LM-20 connected direct to 20 hp. GE 3600 RPM 220-440 approximate cap 350 gal per min.
1 Myers Centrifugal water pump Model 25HM-5 connected direct to a 5 hp. 1750 RPM 220-440 approximate cap 150 gal per min.
1 5x6 Centrifugal water pump belt drive.
1 8" Morris Centrifugal water pump.
1 4x6 Sand pump Kansas City Hay Press
1 15 ft. pc. 8" suction hose with foot valve.
1 12 ft. pc. 6" suction hose with foot valve.

**ELECTRICAL EQUIPMENT:**

1 100 KW Generating Unit 220-440 V Direct connected to Cummins Diesel 6 cyl Model NHSGA with automatic shut-off.
1 50 KW Generating Unit 220V Direct connected to 6 cyl Buda Model M766 Gas power.
1 Capacitor for power factor improvement Type DL422 230 V 3 phase.
(1) 40 hp, (2) 25 hp, 1200 RPM motors.
(1) 15 hp, (2) 10 hp, (2) 7½ hp, (3) 2 hp 1750 RPM motors. Above motors are 220-440 3 phase and most of them are totally inclosed.
(1) 7½ hp, (3) 5 hp, (1) 3 hp, (3) 2 hp Master Gear Head Motors Power shafts 155 RPM 220-440 3 phase and totally inclosed. Were used on conveyors.
Miscellaneous switches and starters and wire for electrical equipment.

**LOADING & HAULING EQUIPMENT:**

1 175 A 2¼ yd Michigan Diesel Power, Rubber Tired Loader.
1 L-41 Lorain Shovel with Cat 318 Power.
1 #25 Bay City Shovel ½ yd with gas power.
1 Haas Crawler mounted bucket loader.
1 International R190 Tandem with 10 yd dump.
2 Koehring Semi-trail Dumps with gasoline tractors approximately 10 yds.
1 1¼ yd Bay City Drag Line Bucket
1 1¼ yd Perforated Hendrick Drag Line Bucket.
2 Daybrooke 4 yd dump bodies.
An all steel tipple, a quantity of conveyors and miscellaneous items too numerous to mention.
1 Steam Jenny
1 M&M Power unit Model 165-4A gas

**HURON SAND & GRAVEL COMPANY**

Route 3 Willard, Ohio



## BONDED® VIBRATING SCREENS

**PROMPT SHIPMENT OF ALL MODELS**

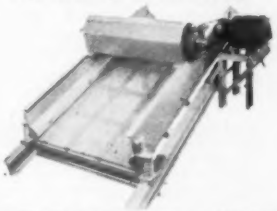
### GENERAL DUTY SCREENS

**PERFECT BALANCE AND SHARP ACTION.** Eccentric weight mechanism, spring mounted. 1 to 3 decks, 2' x 4' to 3' x 8'. **WRITE FOR "SEVEN SECRETS OF SUCCESSFUL SCREENING" IN BULLETIN NO. 1086.**

For the accurate and economical screening of sand, gravel, crushed stone, ores, broken rock, slag, clay and cement products and lightweight aggregates. All Bonded Screens built of structural steel, welded and reinforced with additional members on all points of strain and factory tested and balanced. Available in enclosed models where dust and flying particles need to be contained. For almost any type of screening operation, wet or dry.

**Priced from** .....$443

### SPECIAL SERVICE SCREENS



**WRITE FOR BULLETIN #1224 TYPE C**

For scalping middle-range pieces and accurate sizing of fines and above listed products but where quantity and feed do not warrant a larger capacity, heavy duty model. Medium to heavy construction. Can also be suspended from four steel cables and springs for portable or temporary installation. Vibration remains in working screen body. No shaking of tipple, building or platform.

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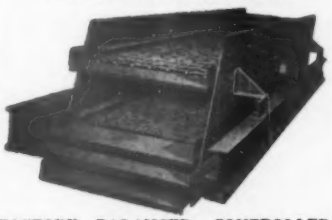

**FACTORY BALANCED, CONTROLLED VIBRATION.** Four bearing positive throw eccentric shaft: 3' x 6' to 5' x 14'. 1 to 5 decks. **WRITE FOR BULLETIN NO. 1087 AND 9 REASONS WHY BONDED IS YOUR BEST BUY.**

For high tonnages, heavy scalping and multiple sizing of such minerals and industrial products as handled by above models. No dead spots. Springless live-rubber mounting of screen body controls vibration. Screen cloth and plate in all models reversible for longer life. Their finished edges prevent plates from splitting and cloth from ravelling.

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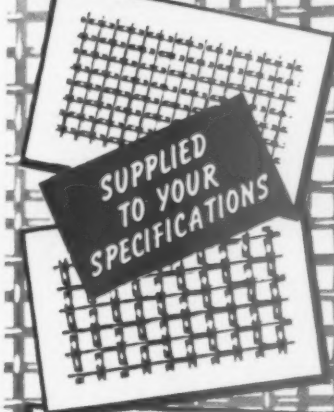


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Buffalo type B 60 ton motor truck scales 45' x 12' platform, tape recorder and printer
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Fuller Kenyon Airslide cement conveying system
Schram 600 ft. portable air compressor. GMC.
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4 Mack B-63-6 trucks, 12 yds. Heil dump bodies.
10 Euclid 28 FD rear dumps 15 ton cap. Cummins
13 Euclids rear dump 12 FD 15 ton; 7 Euclid bottom dump 43 RDT 18 ton
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3 Euclid Model 25 LDT, 25 yd., bottom dump

**CRUSHERS—KILNS—DRYERS**

**JAW:** Reliance, 14x24. Buchanan 18x36, 36x42, Type C 30x42, Cedar Rapids 2836, Traylor 28x36, 36x48, 56x72. Lippman 24x36; Universal 30x42; Superior McCully 42x40.
**GYRATORY:** Al. Chal. 8, 5K, 10", 16. Gates 12K; Traylor T2 Kennedy Van Saun 37½.
**CONE:** Symons 3', 4¼', 5½'. Kue-Ken 30"; Traylor TY4; Telsmith 36.
**ROLL:** Cedar Rapids 24x16, 55x30; Al. Chal. 37x16, 42x16. Pioneer 40x22, 40x24 triple, 54x24; Telsmith 40x22; Universal 30x18; Lippman 40x20.
**MILLS—ROD**—Denver 4x8, 4x10; Hardinge 4x10; Marcy 3x8, 8x12.
**TUBE:** Al. Chal. 6x22, Smidth 5½x28, 6'6"x21; Hardinge 4½x16" 8x18"; 8x9'; 8x36; 8x48; 10x48.
**HAMMERMILLS:** Penn 8XT-350 HP motor, 6XB 10'x4'7"; Stedman 24x30, 36x42; Cedar Rapids 50-50, 2033, 30x33, 30x42 double; Dixie 36x50.
**AUTOCLAVES:** J&C 6'6"x58" Quick Acting.
**KILNS:** 6'x50'; 9'x100'; 8x124'.
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Pioneer 10"x16" Crush. Plant with Pioneer 305-W Washing-Screening Plant
Eagle log washers Model BMD 48"x30"; BMD 4322 7'x21' Twin, 36"x20' dbl. log washer, 36"x20' Pioneer Port. 10x24 jaw, 24x16 roll. Complete C-R Prim. Port 22x36. Diesel.
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Johnson 150 ton 3 compt. aggr. cement silo. 1500 bbls. Complete.
Johnson 400 yd 6 compt. aggr. large capacity.
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Johnson TY 227, 70 cu. yds. 105 ton 3 compt. aggr. bin TY 168 batcher
Noble CA 354, 4 compt. large capacity. Complete
Noble CA 154, 150 tons 4 compts. aggregate cement silo 2000 yds.
Erie Strayer 120 tons aggr. bin, 880 bbls. cement
Erie Strayer, new 1955, 40 yds per hour.
Blaw-Knox BCPC 600 bbl. cement silo
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Mixermobile Model M5, 2 yd capacity w/tower, new motor, etc.
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Morris 6" Diesel on 14'x36' hull
Ellicott 14" x 12" Steel Hull 64' x 22' Diesel.
10" Portable Diesel powered. Complete.
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6" portable Diesel complete with cutters, etc.

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Tyler-Hummer 4'x10' 2 Deck
New Symons 3'x12' 5 HP Elec. Motor.
Pioneer 5'x12' 3 deck spring suspension
Cedar Rapids 4'x12' dbl. deck 25 H.P. elec. motor
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2—Allis Ch. 7'6" x 7' x 125' Rotary Kilns.
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1—Vulcan 8' x 80', ½" shell.
1—Vulcan 7' x 80', ½" shell.
2—Link Belt Roto Louvre Dryers, 6'4"x24'.
1—Rennenberg 6' x 50', ⅜" shell.
1—Ruggles Cole 5' x 30', ⅜" shell.
1—Allis Chalmers 4' x 40'.
1—Allis Chalmers 4' x 30', ⅜" shell.
1—34" x 30', ⅞" shell.

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SCREEN—Telsmith 3 deck 3' x 10'
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3—10'x78' Dryers—2'3'4'5½' Symons and Telsmith Cone Crushers—3648-4042-4872 Jaw Crushers and smaller sizes—Jeffrey 2448 DTF Vibrating Feeders—other types of Feeders—Eagle Fine & Coarse Material Washers—Dixie Non Clog moving plate Hammermills—Asphalt Plants— Jaw— Cone— Gyratory— Roll Double and Triple—Hammermill and Impact Crushers —Ball—Rod—Tube Mills—Screening, Washing and Crushing Plants, Classifiers Compressors, Conveyors, Cranes, Drills, Dump Cars, Dredges, Feeders, Hoists, Motors, Generators, Kilns, Dryers, Locomotives, Pumps, Screens, Shovels, Draglines, Transformers, Euclid Trucks.

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**Heavy duty, 2500-3000# cover tensile, 16-19# friction pull. Brand new.**

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| 24" (5 ply) | ⅛"x⅛" | $8.78 | $5.09 |
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Many other sizes. Samples on request. Distributor inquiries invited.

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**60"x48" to 6"x3"**
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8'—0 x 80'—0 x ⅝" Welded Shell Traylor Engineering

New 1956, Excellent Condition complete with drive and controls 100 HP 440 V, 3P, 60 Cy

Also other sizes Dryers & Coolers

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Three-year old feeder-crusher unit complete — motors, drives, controls, chutes, grizzley, platform, etc. May be seen in operation until June—Available in July. Cedarapids Equipment. Jaw crusher 32" x 40 "—Serial No. 18238. Feeder 42" x 14'. Serial No. 18238. Priced at $20,000 loaded.

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Four used 6 yard Koehring Dumptors, serial No's D3131, D3349, D3905, D3937. These dumptors are powered with 4-71 GMC Diesel Engines and have been reconditioned and are ready to use. Your choice for $5,000. Contact

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15W Bucyrus-Erie Draglines, 14 yd.
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5W Bucyrus-Erie Draglines, 5 yd.
200W Bucyrus-Erie Draglines, 8 yd.
170B Bucyrus-Erie Shovel, 6½ yd.
120B Bucyrus-Erie Shovel, 5 yd.
54B Bucyrus-Erie Shovel, 2½ yd.
38B Bucyrus-Erie Shovel, 1½ yd.
80D Northwest Shovel, 2½ yd.
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3000 Manitowoc Draglines, 1¾ yd.
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1201 Lima Draglines, 3 yd.
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7460 Marion Walking Draglines, 9 yd.

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New 25 H.P. Hyd. Drive Sets Speed Range 0-490 RPM 440-3-60 ..... $850.00
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All sizes new and rebuilt motors
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New 1½" Pitch Roller Chain . $3.00 per ft.
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All sizes—Not War Surplus.

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**New Bulk Cement Trailers**
**1—Gravity 1—Auger**
**Designed for 50' O.A.L. & 73,280 G.V.W.**

**Call or write Bill Becker**

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FOR SALE—D 13,000 Power Units Serial Nos. 1N-1089; 4S-1869 SP; 4S-1879 SP.

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**FOR SALE—REASONABLE**

Thew L-26 ¾ Yd. Shovel
S/N 26401—4 yrs. old
GMC Diesel Engine

The Cleveland Quarries Company
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**FOR SALE**

Telsmith 13-B Crusher
84" Telsmith Super Scrubber
Syntron Grizzly Feeder F-86
10" Peerless Turbine Pump, 150 hp. 2000 GPM

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54 x 24 Roll Crusher, Model 1953, Serial No. 54175, good condition.

**WEST LAKE QUARRY & MATERIAL CO., INC.**
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25 & 45 Ton G. E. Diesel Electric Locomotives
65 Ton Porter Diesel Electric Locomotive
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4—65 ton Whitcomb 2—25 ton & 2—20 Ton
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25 ton Amer. Diesel Loco Crane
**ROTARY DRYERS & KILNS**
5' x 25', 6' x 72', 8' x 60', 9' x 160', 10' x 78', 5' x 35' Ruggles-Coles XA-8 Dbl. Shell.
**REDUCTION MILLS & FEEDERS**
5' x 10', 6' x 12" & 7' x 15' Rod Mills
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32" x 40" Cedar Rapids Jaw Crusher w/Feeder
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20" x 36" & 24" x 36" Pioneer Jaw Crusher
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14x28, 15x24 & 10x36 Cedar Rapids Jaw
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#5057 Raymond 5 Roll Highside Mill
4' x 10' Tyler Hummer DD Screen
F55 Syntron Grizzley Feeder
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3—200 HP & 160 HPSD. Ottumwa Elec. Hoists.
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2 Amer. R20-60 Gantry 139' Boom
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1—Clyde #3 Hydrator with motor.
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14—Bucket Elevators, chain mounted, steel casing, 25' to 56' c.c.
1200'—9" and 14" Screw Conveyor.
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Call John Marshall at Akron.
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1 Yd. Lorain L-50. 60' Bm. GM Diesel. New 1951.
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Well known Manufacturer of Heavy Duty Crushing and Grinding Machinery has opening for experienced man. Salary and commission, welfare and retirement plan. Midwest location. Give full details of past experience in first letter. Replies confidential. Box S-3, Rock Products, 79 W. Monroe, Chicago 3, Illinois

## PACKHOUSE SUPERINTENDENT
### CEMENT PLANT

We want an experienced supervisor who can take full charge of modern cement packhouse handling cement in bulk and bags. Ours is a new, growing Eastern cement company and we have a real opportunity for the man who can take full charge of plant operation, machinery maintenance, receiving and shipping, by truck and rail.

Age 30-50.

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Box S-5, Rock Products, 79 W. Monroe, Chicago 3, Illinois

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### FOR CEMENT PLANT

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### FOR NEW CEMENT PLANT

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Age 30-50.

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Box No. S-12, Rock Products
79 West Monroe St., Chicago 3, Ill.

## PLANT ENGINEER

Company expansion offers excellent opportunity to qualified engineer with management potential. Should have maintenance or production experience in a gypsum plant or similar operations. After initial indoctrination, the plant engineer will have complete charge of maintenance and plant improvements. Reply to: Pabco Gypsum Div., P.O. Box 269, Florence, Colorado

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___Aggregates (special)
___Air Compressors
___Asphalt Mixing Plants
___Bagging Machines
___Bags
___Barges
___Belting, Conveyor
___Elevator, Power Transmission
___Belting, V-type
___Belt Repair Equipment
___Bin Level Indicators
___Bins and Batching Equipment
___Bits
___Blasting Supplies
___Bodies, Trailer
___Buckets
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___Coal Pulverizing Equipment
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___Torque Convertors
___Tractor Shovels
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___Trailer Dump Bodies
___Trucks, Bulk Cement
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___Trucks, Motor
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___Wire Cloth
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___Sand & Gravel
___Slag
___Cement
___Lime
___Gypsum
___Ready Mix Concrete
___Concrete Products Type_____
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BOX 398, FOREMAN, ARKANSAS

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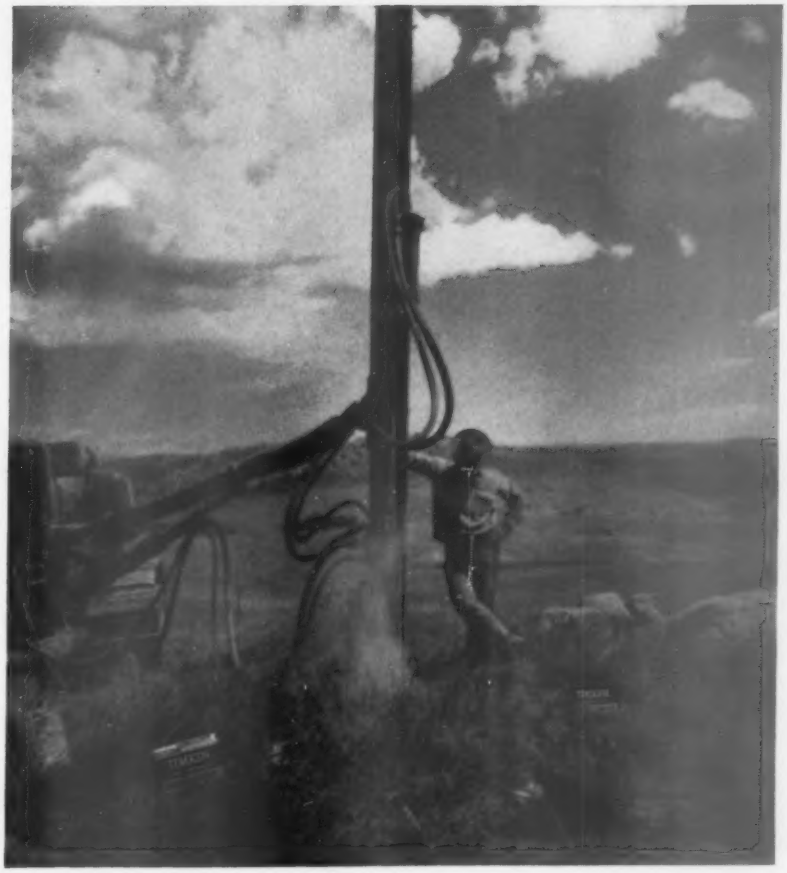

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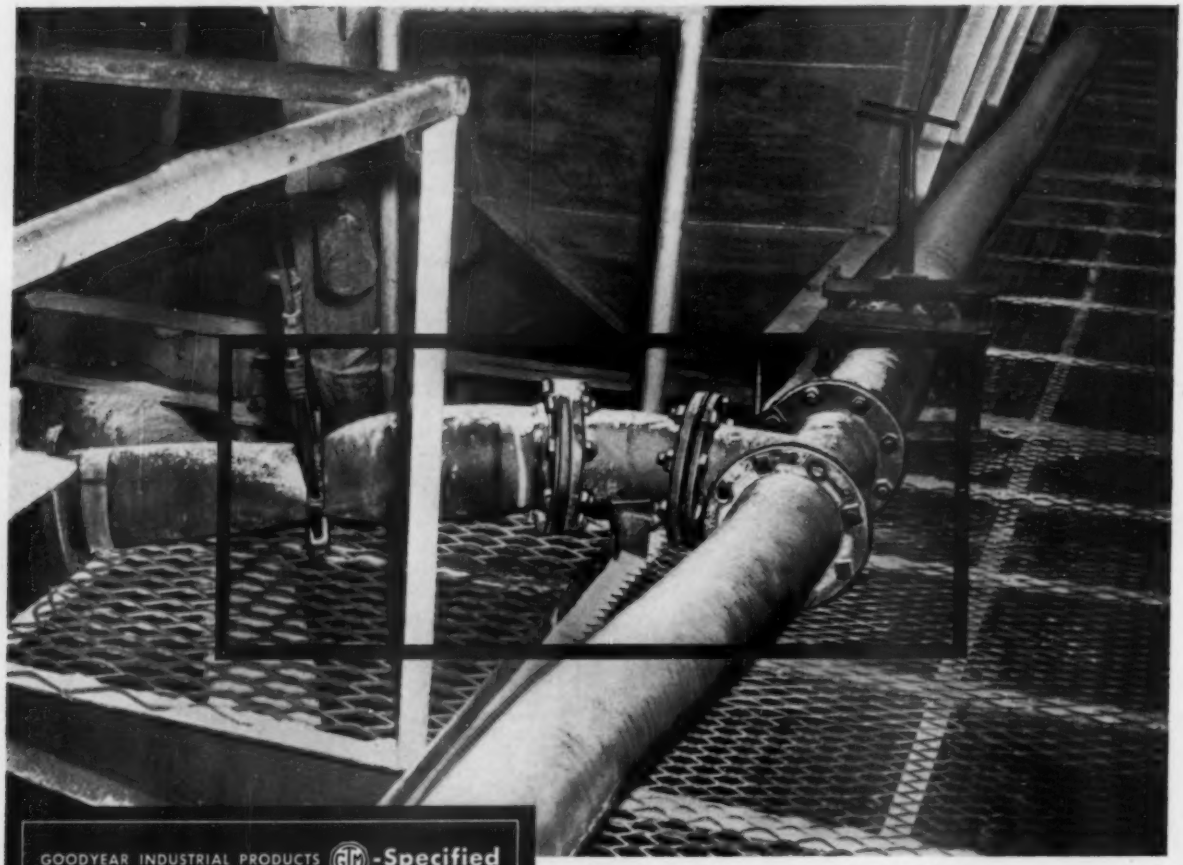

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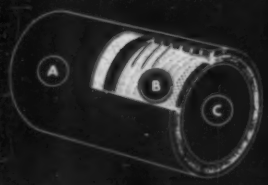
Diversipipe for handling abrasives and corrosives

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